Guide for Tree Farm Licence Management Plans (20-month) and Calendar Year Reports

March 2001

Ministry of Forests

Resource Tenures and Engineering Branch
Timber Supply Branch

Table of Contents

INTRODUCTION 1

Roles and responsibilities 1
Relationship of AAC determination to MP approval 1

TFL MANAGEMENT PLAN APPROVAL PROCESS 2

MANAGEMENT PLAN REVIEW 3

Purpose 3
Licence requirement 3
Roles and responsibilities 3
MP review 3
List of subjects for review and discussion 5
Contacts for TFL MP preparation 7

DRAFT MANAGEMENT PLAN 8

Purpose 8
Licence requirements 8
Content 9
Roles and responsibilities 11
Example format 12

TIMBER SUPPLY ANALYSIS INFORMATION PACKAGE 16

Purpose 16
Licence requirements 16
Content 17
Roles and responsibilities 18

PROVINCIAL GUIDE FOR THE SUBMISSION OF TIMBER SUPPLY ANALYSIS INFORMATION PACKAGES FOR TREE FARM LICENCES 19

TREE FARM LICENCE INFORMATION PACKAGE GUIDE 75

Appendix 1 Standardized Format for Yield Table Submissions other than VDYP and TIPSY 75

TIMBER SUPPLY ANALYSIS 80

Purpose 80
Licence requirements 80
Content 80
Roles and responsibilities 80
Tree farm licence timber supply analysis report guide 81

TWENTY-YEAR PLAN 84

Purpose 84
Licence requirements 84
Content 84
Roles and responsibilities 85
Example format 85

PROPOSED MANAGEMENT PLAN 88

Purpose 88
Licence requirements 88
Content 89
Roles and responsibilities 89
Example format 90

Table of Contents

AAC DECISION AND MP APPROVAL **92**

(OPTIONAL) CALENDAR YEAR REPORTING **93**

PURPOSE 93
LICENCE REQUIREMENTS 93
ROLES AND RESPONSIBILITIES 93
EXAMPLE FORMAT 93

ACRONYMS **95**

Introduction

This guide is to be used for the preparation, review and approval of each component of the Tree Farm Licence (TFL) management plan (MP). Users of this guide will include TFL holders, the Ministry of Forests (MoF), Ministry of Environment, Lands and Parks (MELP) and other agencies.

It includes the purpose, obligations, roles and responsibilities, and provides example formats for all MP components:

- Management Plan Review (MPR);
- Timber Supply Analysis Information Package (IP);
- Timber Supply Analysis (Analysis);
- Twenty-Year Plan (TYP);
- Draft and Proposed MPs.

The components are derived from the *Forest Act* and the TFL agreement, which requires licensees to prepare a MP every five years for the approval of the chief forester (CF). The generic TFL document, which forms the basis for every TFL agreement, was revised in 1999 to replace the previous 30-month MP process with a streamlined 20-month MP process.

The guide also provides similar information for the optional Calendar Year Report.

Roles and responsibilities

The TFL agreement designates the roles and responsibilities for each MP component to MoF and licensee staff. Various resource specialists and the MELP also play key roles. The contact list from the MP Review component (see page 7) provides further information.

Relationship of AAC determination to MP approval

The *Forest Act* requires an allowable annual cut (AAC) determination for each TFL at least once every 5 years. Because certain key information contained in the MP is considered by the CF in the AAC determination, the MP approval and the AAC determination are synchronized whenever possible.

TFL Management Plan Approval Process

(for assistance, refer to "Acronyms" section, page 95)

Months prior to MP expiry		Component (condition number from generic TFL dated August 27, 1999)		Example calendar
20	_____	Regional Manager (RM) provides MP Review & guidelines *(2.03)*	_____	Apr. 30
18	_____	Timber Supply Forester (TSF) may provide timber supply information requirements *(2.05(g))*	_____	Jun. 31
16	_____	Licensee submits IP to TSF *(2.04)* Licensee submits DMP to RM *(2.08)*, and refers and advertises DMP *(2.12)*	_____	Aug. 31
13	_____	TSF accepts IP *(2.06)* or does not accept IP *(2.07)* RM provides comments on DMP to Licensee *(2.16)*	_____	Nov. 30
12	_____	Licensee submits copy of notice, comments and proposals regarding DMP*(2.17)*	_____	Dec. 31
10	_____	Licensee submits TYP to District Manager (DM) *(2.18)* and Analysis to TSF *(2.22)*	_____	Feb. 28
7	_____	DM accepts TYP *(2.20)* or does not accept TYP *(2.21)* TSF accepts Analysis *(2.24)* or does not accept Analysis *(2.25)*	_____	May. 31
4	_____	Licensee submits PMP to CF and RM *(2.26)*	_____	Aug. 31
2	_____	CF approves PMP *(2.28)* or does not approve PMP *(2.31)*	_____	Oct. 31
0	_____	Expiry of current MP	_____	Dec. 31

1. Components that are not accepted or are not approved may require new or revised submissions as applicable and are subject to alternative deadlines. Refer to appropriate condition number in Part 2.00 of the TFL agreement for further information.
2. Amendment(s) may be required to the IP, Analysis, TYP or DMP if submitted less than a specified number of months prior to MP expiry (2.37).
3. Approval of the PMP should occur no later than the AAC determination for the TFL.

Specific clauses (labelled as e.g. "2.03") in this guide are based upon the August 27, 1999 generic TFL document, and may not align exactly with every TFL agreement.

Management Plan Review

Purpose

To review the performance of the licensee in achieving the objectives and commitments in the current MP and any other directives or requirements that may have been issued through other means such as the licence, AAC rationale or the MP approval letter.

Licence requirement

2.03 Not less than 20 months prior to the date on which the management plan in effect under this Licence is due to expire,

(a) the Regional Manager (RM) will provide the Licensee with a review

(i) of the management plan in effect under this Licence,

(ii) the Licensee's performance in respect of that management plan, and,

(b) a list of guidelines currently in effect, and,

(b) the Regional Manager may specify the location(s) and time designated for the draft management plan public review.

The generic TFL defines "guideline" as "a guideline, guidebook, policy, procedure or manual regarding forest practices applicable to all or part of the Licence Area, which has been set or approved by the Ministry."

Roles and responsibilities

Regional Manager

- **Month 22 or earlier:** Regional contact conducts MP Review.
- **Month 20 or earlier:** RM provides MP Review to the licensee.

MP review

The following is a recommended process to be used by the regional contact to fulfill the responsibility for the MP Review.

1. Summary of Performance Criteria:

The regional contact should review the appropriate documents and create a summary of the performance criteria that exist as a specific commitment, instruction or expectation associated with the management of the TFL. The following is a list of possible documents that should be reviewed:

- Current MP;
- AAC rationale and CF's MP approval letter;
- TFL agreement and instruments; and
- Guidelines, policies, procedures, guidebooks or manuals in effect.

2. Performance Review:

The next step is to review the licensee's performance with respect to the achievement of the commitments and obligations. This task may be accomplished by reviewing the licensee's annual report or any other performance report, along with input from MoF, MELP and licensee staff. The Ministry of Forests staff includes specialists from the region, district and branch. In addition, a *List of Subjects for Review and Discussion* is included on page 5 that identifies potential areas for review.

Input from ministry and MELP staff may be gained through a meeting at the district or region or through written correspondence (regular mail or e-mail).

3. Management Plan Review Letter:

The product from the review is a letter from the RM to the Licensee (with copy to MELP) that includes the following:

a) A review of the licensee's performance with respect to the commitments and requirements completed under items 1 and 2 above.

b) Summary of issues that should be addressed in the draft MP.

c) A List of Guidelines currently in effect.

The definition of a guideline in the licence is broad and includes guidelines, policies, procedures, guidebooks or manuals. There are many documents that meet this definition of a guideline. The licensee is responsible for being aware of and to consider the various guidelines during the preparation of the MP. It is **not** intended here to include an all-encompassing list of existing guidelines. It is intended to draw specific attention to any guideline that has particular importance for the management of the TFL in question.

The List of Guidelines should distinguish between:

1) Guidelines that must be considered by the licensee when preparing the MP. Examples that could be included in the first group include:

MoF planning guidelines; MELP habitat management guidelines;

Guide for Tree Farm Licence Management Plans (20-Month); and any regional or district policy or standard.

2) Guidelines with which the MP must be consistent. The MP must closely adhere to the requirements of these guidelines. Currently there are none that could be included and the regional contact should discuss the issue with Resource Tenures and Engineering Branch (RTEB) staff prior to listing any guidelines in this category.

d) Specified locations and times for the draft MP public review. This is **discretionary,** and the default is that the licensee is required to provide for a public review at the licensee's place of business nearest to the licence area, or at a location and time agreed to by the RM and licensee at a later date.

e) A statement that the IP and draft MP is due in 4 months.

f) A recommendation that the IP be made available for public review at the same time as the draft MP.

g) A statement that the MoF is willing to further discuss the review and issues presented in the letter.

h) A list of contacts (see table on page 7).

i) A statement that any further communication or clarification of the MP approval process should be directed to the regional contact.

Management Plan Review

List of subjects for review and discussion

(Example only – not limited)

1.0 *Harvesting*

- 1.1 Operable land base accurate? Operability mapping available? Current?
- 1.2 Profile being harvested by operability class? By terrain? Height/site class? Timber/problem types? Silviculture system?
- 1.3 AAC partitioned? Harvested adequately? Future partition requirement?
- 1.4 Seral stage objectives being met?
- 1.5 Is licensee following cover and adjacency constraints modelled in last analysis? Meet green-up standards re: adjacency/wildlife/hydrology?
- 1.6 Cutblock sizes range?
- 1.7 What is TFL contribution to overall company wood supply?
- 1.8 Small Business Forest Enterprise Program (SBFEP) planning concerns?
- 1.9 Harvesting systems same as MP commitments?
- 1.10 Contractor clause/cut control performance?
- 1.11 Meeting utilization standards?

2.0 *Forest Inventory*

- 2.1 What inventory commitments were made in current MP? What date is inventory for analysis current to? Does it meet standards?
- 2.2 Have inventory audit, PSP, OGSI or any other special projects been completed? Do any influence Analysis? Other growth and yield or inventory initiatives underway?
- 2.3 Format of submitted inventory information agreeable to TSB? Will (or has) inventory information consistent with TSR information been submitted to Resource Inventory Branch for incorporation in provincial inventory?
- 2.4 Which yield curves will be used in next analysis? Agreeable to MoF?

3.0 *Other Inventories*

- 3.1 Identify inventories required in last MP approval letter. Status?
- 3.2 Review list of required inventories relative to Resources Inventory Commission (RIC) list to see if RIC standards appropriate.
- 3.3 Any additional inventories required? Any not required?

4.0 *Fire*

- 4.1 Commitments and obligations being met?
- 4.2 Additional plans required?

5.0 *Forest Health*

- 5.1 Identify pests, previous pest problems, and newly emerging problems. Appropriate strategies to deal with the problems.
- 5.2 Pest impacts on AAC and site productivity identified?
- 5.3 Do NRL and endemic loss assumptions from yield estimates reflect actual losses?

6.0 *Engineering*

- 6.1 Road deactivation/maintenance issues?
- 6.2 Multiple industrial road use problems?
- 6.3 SBFEP/public/other access concerns? Road signage issues?
- 6.4 Appraisal specifications matching road standards?

7.0 *Silviculture*

- 7.1 Backlog NSR? Basic/incremental?
- 7.2 Silviculture standards developed?
- 7.3 Type I or Type II strategic analysis done?

Management Plan Review

List of subjects for review and discussion (concluded)

8.0 *Recreation*

- 8.1 Wilderness areas?
- 8.2 Inventory/analysis carried out?
- 8.3 Current/potential recreation activities?
- 8.4 Sites/trails? Maintained?
- 8.5 Reserves established/needed?
- 8.6 Access?

9.0 *Visual Landscape Management*

- 9.1 Visual landscape inventory completed?
- 9.2 Scenic areas made known in Higher Level Plans (HLP) or by DM? VQOs established? Management requirements?

10.0 *Planning*

- 10.1 All resource mapping completed, and plans for agency review in place?
- 10.2 Local Resource Management Plan (LRMP)? Any LRMPs required?
- 10.3 Any HLPs, including objectives for riparian management zone (RMZ), landscape unit (LU), sensitive areas, recreation sites, recreation trails and interpretive forest sites?
- 10.4 Other example issues:

Archaeological/heritage sites	Trappers/hunters/guide outfitters
Land claims	Parks/commercial recreation
Mining/hydro	Mariculture/aquaculture
Botanical forest products	Gravel pits
Seismic development	Squatters
Firewood cutters	

11.0 *Biodiversity/FPC*

- 11.1 Riparian condition?
- 11.2 Community watersheds? Water users?
- 11.3 Biodiversity (LUs, Old-Growth Management Areas (OGMA), Wildlife Tree Patches)?
- 11.4 Species and plant communities at risk?
- 11.5 Ungulate winter ranges (UWR)?
- 11.6 Agency/public concerns or plans?

12.0 Public Involvement

- 12.1 Key players?
- 12.2 Steps taken to foster public involvement?
- 12.3 Open house needed for draft MP?
- 12.4 Level of advertising required for draft MP viewing?
- 12.5 Affected communities?
- 12.6 Community use of the TFL, including non-timber resources?

13.0 *Range*

- 13.1 Problems/conflicts/resolving seedling damage, removing natural barriers/fencing.
- 13.2 Co-ordinated objectives for understory and timber?
- 13.3 Recent assessment of permanent and transitory range?

Management Plan Review

Contacts for TFL MP preparation

TFL _____ MP No._____ Licensee _____

MP component	Office of primary responsibility	Ministry contact
MP review (prepared by MoF)	RM	Regional Contact
Timber Supply Analysis Information Package — **with prior review or acceptance, as applicable, of**:	TSF	
Timber inventory	Resources Inventory Branch (RIB)	Coordinator TFL Inventory 387-9521
Visual landscape inventory	RM/DM	Landscape Forester Recreation Resource Officer
Recreation inventory	RM/DM	Recreation Officer Recreation Resource Officer
Natural stand yield curves	Resources Inventory Branch	Growth and Yield Officer (Predictions) 387-6043
Managed stand yield curves	Research Branch	Growth and Yield Applications Specialist 387-6708
Operability lines	DM	Planner or Timber Officer
Biodiversity (e.g., riparian, OGMAs, wildlife trees, species at risk)	DM, MELP Official	Planner or Timber Officer and Forest Ecosystem Specialist (FES)
Resource mapping (e.g., environmentally sensitive areas (ESAs))	DM, MELP Official	Planner or Timber Officer and FES
Consistency with higher level plans	DM	Planner or Timber Officer and FES
Draft MP	RM	Regional Contact
TYP	DM	Planner or Timber Officer
Analysis	TSF	
Proposed MP	CF	Regional Contact
Related issues		
MP approval process	RTEB	TFL Forester, RTEB
Other (specify)		

Draft Management Plan

Purpose

The purpose of the draft management plan (DMP) is to:

- Propose management objectives and strategies for achieving those objectives for all forest resources on Crown and private land within the TFL.
- Provide an opportunity for other agencies, the public and other interested parties to review and comment on the proposed objectives and strategies.
- Include details regarding the status of various inventories.

Licence requirements

2.08 Not less than 16 months prior to the date on which the management plan in effect under this Licence is due to expire, the Licensee will submit a draft management plan to the Regional Manager for comment.

2.10 At substantially the same time or at a time otherwise agreed to between the Regional Manager and the Licensee, the Licensee must publish, at least twice within a period of two consecutive weeks, a notice in a newspaper(s) circulating near the area of the Licence stating that the draft management plan is available for public review and comment.

2.11 The Licensee must provide an opportunity to review the draft management plan to members of the public interested in or affected by operations under the Licence.

(a) at a location and time, if specified by the Regional Manager in the management plan review referred to in subparagraph 2.03(b),

(b) at another location proposed by the Licensee and approved by the Regional Manager, or

(c) at the Licensee's place of business nearest to the Licence Area.

2.12 The public review referred to in paragraph 2.11 must provide an opportunity for comment to members of the public interested in or affected by operations under this Licence, including but not restricted to

(i) resource agencies,
(ii) trappers, guide outfitters, range tenure holders, and other licensed resource users,
(iii) aboriginal people,
(iv) local governments, and
(v) members of the public.

2.16 The Regional Manager, within three months after the date on which the Regional Manager receives the draft management plan submitted under paragraph 2.08, will provide the Licensee with written comments on the draft management plan which the Licensee must consider in the development of the timber supply analysis, twenty-year plan, and proposed management plan.

2.17 The Licensee not less than 12 months prior to the date on which the management plan in effect under this Licence is due to expire must consider all comments received during the period for review under paragraph 2.13, and will submit to the Regional Manager

(a) a copy of the notice that was published under paragraph 2.10 in respect of the draft management plan, and

(b) a copy of each comment received by the Licensee in respect of the draft management plan, and

(c) proposals, if any, to address the comments referred to in subparagraphs 2.12 and 2.16, in the proposed management plan, timber supply analysis and 20-year plan.

Draft Management Plan

Licence requirements (concluded)

2.41 If the Licensee fails to comply with the requirements of paragraph 2.40, the management plan in effect under this Licence will expire three months after the date on which the notice referred to in paragraph 2.38 is given to the Licensee, in which case,

(a) within three months after the date on which the management plan expires under this subparagraph, the Licensee will

(i) refer a draft management plan to the Regional Manager and

(ii) at the same time, refer the draft management plan referred to in clause (i) to resource agencies and make it available for comment in accordance with paragraphs 2.10 and 2.11.

Content

2.09 A draft management plan referred to in paragraph 2.08 or subparagraph 2.41(a) must

(a) be prepared by a professional forester in accordance with the manual in effect four months prior to the deadline for submitting the draft management plan under paragraph 2.08 or subparagraph 2.41(a),

(b) be consistent with

(i) this Licence,

(ii) the Acts, regulations and standards referred to in paragraph 9.01,

(iii) higher level plans,

(iv) subject to paragraph 2.37, the guidelines referred to in subparagraph 2.03(b),

and take into consideration the Regional Manager's review under paragraph 2.03,

(c) include inventories, prepared in the manner, presented in the format and meeting the specifications set or approved in the applicable manual in effect six months prior to the deadline for submitting the Timber Supply Analysis Information Package, of

(i) the forest and recreation resources in the Licence Area, based on information collected for this purpose by the Licensee, including information relating to visual quality objectives (VQO), sensitive soils, recreation sites, and the type of timber and terrain, and

(ii) the fisheries, wildlife, range, and cultural heritage resources of the Licence Area, based on the best information readily available to the Licensee,

(d) include proposals for updating the inventories referred to in subparagraph (c) and, if applicable, addressing inadequacies in the inventory information,

(e) propose management objectives regarding

(i) management and utilization of the timber resources in the Licence Area, including harvesting methods and felling, bucking and utilization specifications suitable to the types of timber and terrain specified in paragraphs 1.03 and 1.04,

(ii) protection and conservation of the non-timber values and resources in the Licence Area, including visual quality, biological diversity, soils, water, recreation resources, cultural heritage resources, range land, and wildlife and fish habitats,

Content (concluded)

(iii) integration of harvesting activities in the Licence Area with use of the Licence Area for purposes other than timber production, including use of the Licence Area by

(A) trappers, guide outfitters, range tenure holders, and other licensed resource users, and

(B) aboriginal people claiming an aboriginal interest in or to the area,

(iv) forest fire prevention and suppression, prescribed fire, and fuel management,

(v) forest health, including disease and pest management,

(vi) silviculture, and

(vii) road construction, maintenance and deactivation,

(f) include proposals for meeting the proposed management objectives referred to in subparagraph (e), including measures to be taken and specifications to be followed by the Licensee which meet or, if the Licensee so chooses, exceeds any requirements of the Acts, regulations and standards referred to in paragraph 9.01, or of the higher level plans, or guidelines referred to in subparagraph (b),

(g) specify measures to be taken by the Licensee to identify and consult with persons using the Licence Area for purposes other than timber production, including

(i) trappers, guide outfitters, range tenure holders, and other licensed resource users, and

(ii) aboriginal people claiming an aboriginal interest in or to the area,

(h) assess the impact the draft management plan may have on factors such as harvest levels, economic opportunities, the number of persons employed by the Licensee and contractors of the Licensee, and the protection and conservation of non-timber values,

(i) highlight the key similarities and differences between the draft management plan and the management plan in effect or last in effect under this Licence, and in a summary form compare

(i) the impact, if any, that implementation of the management plan in effect or last in effect under this Licence had, and

(ii) the impact, if any, that the Licensee anticipates implementation of the draft management plan will have

on factors such as those referred to in subparagraph (h),

(j) if applicable, provide that part of the allowable annual cut will be harvested from a specified part of the Licence Area, or from a specified type of timber or terrain,

(k) include any other information on the development, management and use of the Licence Area that the Chief Forester requires, and

(l) if required in the manual referred to in subparagraph (a), provide some or all of the information referred to in this paragraph in the form of maps meeting the requirements of the manual.

Roles and responsibilities

(Roles and responsibilities regarding paragraph 2.41 — which results from current MP being rendered inadequate — are identical to those below except for submission and response timing, and IP recommendation (in italics) in first bullet below)

Licensee:

- Month 16 or sooner:
  - Before submission, anticipates issues and makes revisions as discussed with regional contact.
  - Publishes notice in newspaper(s) that MP available for public review (this includes agency) and comment (see paragraphs 2.10 to 2.12). *While not specifically required, it is recommended that the IP be made available for public review at same time as draft MP.*
  - Submits draft MP to RM (see 2.08) with copies to TFL Forester in RTEB (to be shared with TSB) and DM.
  - Notifies MELP FES in district that one copy submitted to DM for comment by DM and MELP. If requested, submits one copy of draft MP to MELP FES as well.

Regional Manager

- **Upon receipt:** regional contact reviews and requests comments from district(s), region and branches. Encourages discussion to ensure draft MP reflects comments and issues raised in the MP Review.
- **Month 13 or sooner:** regional contact prepares RM response letter (see 2.16) that includes collated review comments and any request for revisions.

Licensee:

- **Month 12 or sooner**: (see 2.17) Submits to RM copies of:
  - Newspaper notice(s)
  - Draft MP comments
  - For each written comment received, proposals if any, to address each comment in proposed MP, Analysis and TYP.

Draft MP Contacts:

- Responds to regional contact in timeframe specified.
- DM and Timber Supply Forester (TSF) ensures consistency between Analysis, TYP and draft MP as applicable.

Draft Management Plan

Example format

The MP must at minimum be consistent with the requirements of paragraph 2.09(b), except for guidelines. For further information, see page 4, Item 3(c).

Title Page

- Licence Number
- Term of Plan
- Author

Table of Contents

- Maps, Photos, Figures
- Tables
- Appendices
- Map Folio Index

1.0 Introduction

1.1 Description of TFL

- Geographic Location, Size
- General Biogeoclimatic Description
- Small-scale key map with major geographic features, established communities.

1.2 History and Commitments

Summarize from the date of first award:

- Major Area Revisions
- Changes In AAC And Ownership
- Other Relevant Items

Summarize commitments still in effect from:

- TFL Application
- Accepting Replacement TFL Offer
- Minister's Consent to TFL Transfer
- MP Approval and expectations from AAC Rationale

Summarize current performance relative to commitments.

2.0 Planning (2.09(b))

- List approved or proposed HLPs (and approval or proposed approval) dates.
- Detail strategies or objectives pertaining to TFL management.
- List and describe other planning initiatives (e.g., approved plans, direction from government agencies) that affect TFL.

Example format (continued)

3.0 Resource Inventories (2.09(c), (d))

Provide the approval date and status of the following inventories (by TFL Block where more than one block exists). Actual inventories or summaries of the inventories should be included as an appendix:

- Forest Cover
- Recreation (Includes Recreation Sites)
- Visual Landscape (VQOs)
- ESAs, Terrain Stability (Sensitive Soils)
- Type of Timber and Terrain (Operability)
- Fisheries
- Wildlife
- Range
- Cultural Heritage Resources
- Others

And provide:

- Proposals to update, and if applicable, to address inadequate inventories.
- Description(s) of standards or intensity that inventories were or will be completed to.
- Projected timelines for completion and approval.

4.0 Management Objectives (2.09 (e), (f))

Management objectives must be proposed for each resource value and management activity, as applicable. Proposals must then be made to meet each of the proposed management objectives including the measures to be taken, and specifications to be followed.

4.1 Management and Utilization of Timber Resources

- Harvesting Methods
- Felling, Bucking and Utilization Specifications, if proposed to be different from those in TFL agreement
- Partitions (e.g., Geographic Area/Timber Type/Terrain)
- Desired (or Estimated) AAC
- Integration With SBFEP

4.2 Protection and conservation of non-timber values and resources, including

- Visual Quality
- Biological Diversity
- Soils
- Water
- Recreation Resources
- Cultural Heritage Resources
- Range Land
- Fish And Wildlife Habitat

4.3 Integration of harvesting activities with non-timber uses, with:

- Trappers
- Guide Outfitters
- Range Tenure Holders
- Other Licensed Resource Users
- Aboriginal People

Example format (continued)

4.4 Forest fire

- Prevention And Suppression
- Prescribed Fire
- Fuel Management

4.5 Forest Health

- Disease Management
- Pest Management
- Other

4.6 Silviculture

- Basic
- Incremental
- Backlog

4.7 Roads

- Construction
- Maintenance
- Deactivation

5.0 Consultation with Other Resource Users (2.09(g))

- Trappers
- Guide Outfitters
- Range Tenure Holders
- Other Licensed Resource Holders
- Aboriginal people claiming an aboriginal interest in or to the area.

6.0 Impact Summary of MP Implementation (2.09(h))

Assess the impact the implementation of the draft MP may have on the following factors:

- Harvest Levels (Current and Projected)
- Economic Opportunities
- Numbers Of Employees and Contractors Of Licensee
- Protection and Conservation of Non-Timber Values
- Other Relevant Items

7.0 Similarities and Differences between MPs (2.09(h), (i))

- Highlight key similarities/differences between current MP and draft MP; and
- Summarize any impact from implementing current MP and draft MP on the factors listed in **6.0 Impact Summary of MP Implementation** above.

8.0 Schedule B Prorate (2.09(k))

$$\text{Prorate (to 3 decimal places)} = \frac{\text{Current THLB (Schedule B Land)}}{\text{Current THLB (Total TFL)}}$$

Provide the current timber harvesting land base (THLB) areas for:

- Schedule A Land
- Schedule B Land
- Total TFL

Example format (concluded)

9.0 Public Review

- Statement that MP is only component subject to public participation.
- Provide details as to how, when and where MP is being reviewed.

Appendices
(2.09(k), (l))

I Map Folio

Prior to submission, check with the regional contact regarding mapping requirements:

- Biogeoclimatic Information
- Community Watersheds
- Cultural Heritage Sites
- ESAs
- Forest Cover
- Forest Ecosystem Networks
- Landscape Inventory
- Landscape Units and BEOs
- Old-Growth Management Areas
- Operability
- Physical and Administrative Features
- Recreation Inventory
- Resource Management Zones
- Soil Classification
- Species at Risk
- Stream, Lakes and Wetland Classification
- Tenure Status
- Trapping/Guiding Licenses
- TYP
- Ungulate Winter Ranges
- Other Relevant Maps

II Other Information

- Licence holder and administration – provide a general company profile including operations.
- Recreation Report and Maps
- Visual Landscape Report and Maps
- Fisheries and Wildlife Report and Maps
- Resource Inventories

Timber Supply Analysis Information Package

This chapter subject to periodic revision. For more information, please contact the Senior Analyst, TFLs at (250) 387-8388

Purpose

See Page 24.

Licence requirements

2.04 Not less than 16 months prior to the date on which the management plan in effect under this licence is due to expire, the Licensee will submit a Timber Supply Analysis Information Package to the Timber Supply Forester.

2.06 Where the Timber Supply Forester accepts both the assumptions and the methodology referred to in paragraph 2.05 or subparagraph 2.07(b),

(a) the Timber Supply Forester, within three months after the date on which the Timber Supply Analysis Information Package is submitted under paragraph 2.04, or one month after the information or proposals submitted under subparagraph 2.07(b), will in a notice given to the Licensee accept the assumptions and the methodology referred to in paragraph 2.05 and, if applicable, subparagraph 2.07(b) for use in the timber supply analysis referred to in paragraph 2.22 subject to such conditions as the Timber Supply Forester considers necessary or appropriate, if

(i) the requirements of paragraph 2.05 and, if applicable, subparagraph 2.07(b) have been met, and

(ii) the Timber Supply Forester is satisfied with the information provided in support of the assumptions and methodology.

2.07 Where the Timber Supply Forester does not accept both the assumptions and the methodology under paragraph 2.06,

(a) the Timber Supply Forester, within three months after the date on which the Timber Supply Forester receives the Timber Supply Analysis Information Package submitted under paragraph 2.04, or one month after the date on which the Timber Supply Forester receives the information or proposals submitted under subparagraph (b), will specify in a notice given to the Licensee why the Timber Supply Forester has not accepted the assumptions, the methodology or both, and

(b) the Licensee, within two months after the date on which the Licensee is given the notice referred to in subparagraph (a), will

(i) propose new or revised assumptions,

(ii) propose a new or revised methodology, and

(iii) submit further information in support of the assumptions, the methodology or both,

as required by the Timber Supply Forester.

Content

2.05 A Timber Supply Analysis Information Package submitted under paragraph 2.04 or subparagraph 2.07(b) must

(a) include the information required in the applicable manual in effect six months prior to the deadline for submitting the Timber Supply Analysis Information Package,

(b) identify assumptions the Licensee proposes to incorporate into the timber supply analysis referred to in paragraph 2.22 which are consistent with

(i) this Licence,
(ii) the Acts, regulations and standards referred to in paragraph 9.01,
(iii) higher level plans, and
(iv) subject to paragraph 2.40, the guidelines referred to in paragraph 2.03.(b),

(c) without restricting the generality of subparagraph (b), identify assumptions the Licensee proposes to incorporate into the timber supply analysis referred to in paragraph 2.22 regarding

(i) the inventory of timber and non-timber resources in the Licence Area,
(ii) growth and yield,
(iii) regeneration delays,
(iv) silviculture treatments,
(v) integrated resource management constraints,
(vi) harvesting methods and felling, bucking and utilization specifications, and
(vii) the timber harvesting land base,

(d) describe the methodology, including the computer model, if any, that the Licensee proposes to use in the timber supply analysis, including a description of the extent to which the assumptions referred to in subparagraphs (b) and (c) are reflected in the methodology,

(e) include information which supports the assumptions referred to in subparagraphs (b), (c) and (d),

(f) describe how the Licensee proposes to address in the timber supply analysis, any inadequacies referred to in the draft management plan submitted under subparagraph 2.09(d), and

(g) include any other information readily available to the Licensee, which

(i) the Licensee, or
(ii) the Timber Supply Forester, in a notice given to the Licensee 18 months prior to the date on which the management plan in effect under this licence is due to expire,

considers relevant to an assessment of the timber supply of the Licence area.

Roles and responsibilities

Timber Supply Forester (TSF)

- **Month 18 or sooner:** Sends notice (see 2.05(g)) regarding information considered relevant to assessment of timber supply. May include information derived from AAC determination, approved MP, MP review, licensee reports or other sources.

Licensee

- Content should refer to subsidiary components of IP that were accepted or reviewed by appropriate ministry contacts (see page 7 "Contacts for TFL MP Preparation"), before IP submission.
- **Month 16 or sooner:** Submits IP (see 2.04) and copies to region and district using attached format. ***While not specifically required, IP should be referred with DMP.***
  Notifies MELP FES in district that one copy submitted to DM for use by DM and MELP. If requested, submits one copy of draft MP to MELP FES as well.
- **Within two months of rejection (if applicable)**: Submits new, revised or further information (see 2.07(b)).

TSF

- **Upon receipt**: Co-ordinates review of IP with MoF and MELP.
- Attempts to address any shortcomings or concerns in IP with licensee.
- **Month 13 or sooner, or within 2 months of receiving revised IP:** Writes acceptance letter with/without conditions (see 2.06) or rejection (see 2.07) letter.

Provincial Guide for the Submission of Timber Supply Analysis Information Packages for Tree Farm Licences

Version 4

March 2001

Table of Contents

1 INTRODUCTION 24

2 PROCESS 25

2.1 GROWTH AND YIELD 25
2.2 MISSING DATA 25

3 TIMBER SUPPLY FORECAST / OPTIONS / SENSITIVITY ANALYSES 26

3.1 BASE CASE 26
3.2 SENSITIVITY ANALYSES 26
3.3 ALTERNATIVE HARVEST FLOWS OVER TIME 26
3.4 OTHER OPTIONS 27

4 MODEL 28

5 CURRENT FOREST COVER INVENTORY 29

5.1 VEGETATION RESOURCES INVENTORY ISSUES 29
5.1.1 VRI — land base reduction related issues 29
5.1.2 VRI — attribute adjustments 29

6 DESCRIPTION OF THE LAND BASE 30

6.1 TIMBER HARVESTING LAND BASE 30
6.1.1 Timber harvesting land base determination 30
6.1.2 Age class distribution 31
6.2 TOTAL AREA 31
6.3 NON-FOREST 31
6.4 NON-PRODUCTIVE FOREST 32
6.5 INOPERABLE/INACCESSIBLE 32
6.6 NON-COMMERCIAL COVER 33
6.7 LOW SITE 33
6.8 ENVIRONMENTALLY SENSITIVE AREAS 34
6.9 RIPARIAN RESERVES AND MANAGEMENT ZONES — STREAMS 35
6.10 RIPARIAN RESERVE ZONES — WETLANDS AND LAKES 35
6.11 WILDLIFE HABITAT REDUCTIONS 36
6.12 CULTURAL HERITAGE RESOURCE REDUCTIONS 37
6.13 OTHER SENSITIVE SITE REDUCTIONS 38
6.14 PROBLEM FOREST TYPES 38
6.15 ROADS, TRAILS, AND LANDINGS 39
6.15.1 Classified roads, trails, and landings 39
6.15.2 Unclassified roads, trails, and landings 40
6.15.3 Future roads, trails, and landings 41
6.16 EXCLUSION OF SPECIFIC, GEOGRAPHICALLY DEFINED AREAS 42
6.17 ANY OTHER LAND BASE EXCLUSIONS 42
6.18 AREA ADDITIONS 42

7 INVENTORY AGGREGATION 44

7.1 MANAGEMENT ZONES AND MULTI-LEVEL OBJECTIVES (GROUPS) 44
7.2 ANALYSIS UNITS 45
7.3 DETAILED LAND BASE INFORMATION REQUIREMENTS 47

Table of Contents

8 GROWTH AND YIELD 48

8.1 SITE INDEX 48
8.1.1 Site curves 48
8.1.2 Site index adjustments 48
8.2 UTILIZATION LEVEL 49
8.3 DECAY, WASTE AND BREAKAGE FOR UNMANAGED STANDS 49
8.4 OPERATIONAL ADJUSTMENT FACTORS FOR MANAGED STANDS 50
8.5 VOLUME REDUCTIONS 50
8.6 YIELD TABLE DEVELOPMENT 51
8.7 YIELD TABLES FOR UNMANAGED STANDS 51
8.7.1 Existing mature timber volumes 51
8.7.2 Yield tables for unmanaged immature stands 51
8.7.3 Existing timber volume check 52
8.8 YIELD TABLES FOR MANAGED STANDS 52
8.8.1 Silviculture management regimes 52
8.8.2 Regeneration delay 53
8.8.3 Regeneration assumptions 53
8.8.4 Stand rehabilitation 54
8.8.5 Genetic improvement 54
8.9 SILVICULTURE HISTORY 55
8.9.1 Existing managed immature 55
8.9.2 Backlog and current non-stocked areas (NSR) 56

9 PROTECTION 57

9.1 UNSALVAGED LOSSES 57

10 INTEGRATED RESOURCE MANAGEMENT 58

10.1 FOREST RESOURCE INVENTORIES 58
10.2 NON-TIMBER FOREST RESOURCE MANAGEMENT 58
10.2.1 Forest cover requirements 58
10.2.2 Visual resources 59
10.2.3 Recreation resources 60
10.2.4 Wildlife 61
10.2.5 Adjacent cutblock green-up 62
10.2.6 Biodiversity 62
10.3 TIMBER HARVESTING 68
10.3.1 Minimum harvestable age/ merchantability standards 68
10.3.2 Operability 69
10.3.3 Initial harvest rate 70
10.3.4 Harvest rules 70
10.3.5 Harvest profile 71
10.3.6 Silvicultural systems 72
10.3.7 Harvest flow objectives 73
10.4 OTHER 73

11 OPTION ASSUMPTIONS 74

Table of Contents

Tables

TABLE 1. SENSITIVITY ANALYSES 26
TABLE 2. OPTIONS 27
TABLE 3. TIMBER HARVESTING LAND BASE DETERMINATION 30
TABLE 4. AGE CLASS DISTRIBUTION 31
TABLE 5. NON-FOREST AREA 31
TABLE 6. INOPERABLE LAND BASE 32
TABLE 7. NON-COMMERCIAL COVER 33
TABLE 8. LOW SITE 33
TABLE 9. AREA REDUCTIONS FOR ESAS 34
TABLE 10. RIPARIAN RESERVE ZONES — STREAMS 35
TABLE 11. RIPARIAN RESERVE ZONES — WETLANDS AND LAKES 36
TABLE 12. ESTIMATES FOR WILDLIFE HABITAT NO HARVEST AREAS 37
TABLE 13. CULTURAL HERITAGE RESOURCES 37
TABLE 14. OTHER SENSITIVE SITE REDUCTIONS 38
TABLE 15. PROBLEM FOREST TYPES 39
TABLE 16. CLASSIFIED ROADS, TRAILS, AND LANDINGS 40
TABLE 17. ROAD CLASSIFICATION 40
TABLE 18. UNCLASSIFIED ROADS, TRAILS, AND LANDINGS 41
TABLE 19. FUTURE ROADS, TRAILS, AND LANDINGS 41
TABLE 20. EXCLUSION OF SPECIFIC, GEOGRAPHICALLY DEFINED AREAS 42
TABLE 21. AREA ADDITIONS 43
TABLE 22. ZONES AND GROUPS 45
TABLE 23. ANALYSIS UNITS 46
TABLE 24. SITE INDEX SOURCE 48
TABLE 25. SITE INDEX ADJUSTMENTS 48
TABLE 26. UTILIZATION LEVELS 49
TABLE 27. DECAY, WASTE AND BREAKAGE FACTORS FOR UNMANAGED STANDS 49
TABLE 28. SOURCES OF DECAY, WASTE AND BREAKAGE FACTORS 50
TABLE 29. VOLUME REDUCTIONS 51
TABLE 30. EXISTING TIMBER VOLUME CHECK 52
TABLE 31. SILVICULTURE MANAGEMENT REGIMES 53
TABLE 32. REGENERATION REGIME 54
TABLE 33. STAND REHABILITATION 54
TABLE 34. GENETIC WORTH 55
TABLE 35. IMMATURE MANAGEMENT HISTORY 55

Table of Contents

Tables

TABLE 36. BACKLOG AND CURRENT NSR 56
TABLE 37. UNSALVAGED LOSSES 57
TABLE 38. FOREST RESOURCE INVENTORY STATUS 58
TABLE 39 VISUAL RESOURCES 60
TABLE 40. OLD-SERAL TARGETS 64
TABLE 41. LANDSCAPE-LEVEL BIODIVERSITY CONSTRAINTS 65
TABLE 42. WILDLIFE TREE RETENTION CONSTRAINTS 66
TABLE 43. COMMUNITY WATERSHEDS 67
TABLE 44. RIPARIAN MANAGEMENT ZONES 68
TABLE 45. MINIMUM MERCHANTABILITY STANDARDS 69
TABLE 46. OPERABILITY APPROVAL 70
TABLE 47. HARVEST METHODS 70
TABLE 48. HARVEST RULE 71
TABLE 49. HARVEST PROFILE 71
TABLE 50. SILVICULTURAL SYSTEMS 72
TABLE 51. HARVEST FLOW OBJECTIVES 73

1 Introduction

This document is the guide for preparing information packages (IP) for Tree Farm Licence (TFL) timber supply analyses. The IP documents the assumptions and modelling procedures that are used in preparing the timber supply analysis.

Following the format presented in the guide will facilitate the review by Forest Service and B.C. Environment staff. However, in recognition of the varied information sources and models in use in the province, it is not a requirement that the format be followed precisely; it may be adjusted to suit the situation of each TFL. However, significant changes to the format presented here or departures from the modelling methods suggested in this document must be discussed with the Timber Supply Forester at Timber Supply Branch before proceeding.

The purpose of the Timber Supply Analysis Information Package is:

- to provide a detailed account of the factors related to timber supply that the Chief Forester must consider under the *Forest Act* when determining an allowable annual cut (AAC) and how these will be applied in the timber supply analysis;
- to provide a means for communication between licensee, Forest Service and BC Environment staff; to provide Forest Service staff with the opportunity to review data and information that will be used in the timber supply analysis before it is initiated;
- to ensure that all relevant information is accounted for in the analysis to a standard acceptable to Forest Service staff;
- to reduce the risk of having analyses rejected because input assumptions and analysis methods were not agreed upon in advance.

This document is intended to provide guidance for the preparation of IPs for TFLs. The licensee is responsible for keeping abreast of changes in forest practices on their licence and developing appropriate methods for reflecting these in their timber supply analyses even if they are not covered in the guide.

2 Process

In accordance with the TFL agreement, the IP must be submitted to the Timber Supply Forester at Timber Supply Branch (TSB) sixteen months before the date management plan in effect for the licence expires. The Timber Supply Forester must review the package within three months after the date on which the Timber Supply Forester receives the package.

The completed IP must be submitted as an appendix to the timber supply analysis.

2.1 Growth and yield

Prior to developing the growth and yield proposal, the licensee should contact Resources Inventory Branch regarding the development of Natural (unmanaged) Stand Yield Tables (NSYT) and Research Branch regarding Managed Stand Yield Tables (MSYT). Items that must be discussed are, for example, site index (SI) assignment; proposed yield table development; operational adjustment factors (OAF); and decay, waste and breakage (DW2B) factors, genetic gain, yield table development for selection harvesting etc. Once agreement has been reached on the procedures that will be followed, the proposal must be submitted to the Timber Supply Forester at Timber Supply Branch (this person should be identified in the Regional Manager's review of the current MP).

The Timber Supply Forester will forward the growth and yield section of the package to Resources Inventory Branch and Research Branch. The growth and yield foresters in the two branches will communicate with the licensee until all growth and yield issues are resolved. The Timber Supply Forester will advise the licensee regarding the conclusion of the growth and yield review and recommend further action if necessary. Information requirements for the review of growth and yield information are in Appendix I.

2.2 Missing data

To facilitate the review by government staff all the information described below (that is relevant to the TFL) must be provided, including area summaries, yield tables, etc.

An explanation must be provided under each section if information is purposefully omitted.

3 Timber Supply Forecast / Options / Sensitivity Analyses

The purpose of this section is to provide a summary of the harvest forecasts that will be provided. The set of assumptions pertaining to each option and sensitivity analysis will be covered in detail in later sections.

3.1 Base case

When reviewing timber supply for a management unit, a starting timber supply forecast is needed against which timber supply implications of different management assumptions and of uncertainty in data and assumptions may be measured. This starting harvest forecast is commonly referred to as the base case. It is based on current performance or a reasonable extrapolation of current performance. All requirements that would have to be met when applying for a cutting permit, including requirements for the management of non-timber resources, current harvest systems and methods and silvicultural management regimes, should be considered when developing "current performance" assumptions for the base case.

3.2 Sensitivity analyses

The data and assumptions used in timber supply analysis are often subject to uncertainty. To provide a perspective on the effects on timber supply if the data or assumptions used are in fact incorrect, sensitivity analysis is commonly performed. Usually only one variable (data or assumption) from the information used in the base case is changed for each sensitivity analysis.

A complete analysis of the base case includes sensitivity analysis for most of the variables used in the base case. The purpose of Table 1 is to summarize the sensitivity analyses that will be performed for the base case.

Table 1. Sensitivity analyses

Zone/ group/ analysis unit	Sensitivity analysis	Magnitude of change
e.g. Timber harvesting land base (THLB)	e.g. Minimum harvestable age	+/– 10 years
e.g. Partial retention	e.g. Green-up age	+/– 2 years
e.g. Biogeoclimatic variant	Old-seral age	Old-seral age – 50 years

Where necessary, assumptions should be described in more detail.

During preparation of the analysis, more issues that warrant sensitivity analysis may become apparent. The licensee must use professional judgment to decide which additional sensitivity analyses are required to provide the chief forester with a good understanding of the timber supply dynamics of the TFL. These sensitivity analyses must also be included in the timber supply analysis report.

3.3 Alternative harvest flows over time

One of the requirements of *Section 8* of the *Forest Act* is that the chief forester consider the short and long-term implications to British Columbia of alternative rates of timber harvesting from the area.

Several issues must be considered in developing the base case harvest flow. For example, where harvests are declining, the rate of decline from the current harvest level should be controlled to avoid large and abrupt future harvest shortfalls and the long-term level should be stable.

However, there are many possible harvest flows, with different decline rates, starting harvest levels, and potential trade-offs between short- and long-term harvests. Several alternative flow forecasts that will enable the chief forester to assess short-, medium-, and long-term trade-offs must be provided in the analysis.

In this section, describe the decision making process that will be followed to provide appropriate and relevant alternative flow harvest forecasts.

3 Timber Supply Forecast / Options / Sensitivity Analyses

3.4 Other options

In addition to the base case and sensitivity analyses, TFL timber supply analyses may contain options that quantify the impacts on timber supply of pursuing management directions that are different than current management. The purpose of Table 2 is to summarize the issue or management direction each option is intended to reflect. Sensitivity analysis may be warranted to provide a better understanding of the timber supply dynamics associated with each of the options. These must also be included in this table.

The intent of the sections following is to document the assumptions that will be used in the base case. Assumptions associated with each option may be described here, or if more detail is required, under a separate heading for each option at the end of the package.

Table 2. Options

Option title	Issue to be tested	Proposed sensitivity analysis	
		Title	Range to be tested
Base case (current management)	e.g. To model the harvest forecast based on current management practices, performance and currently enforced guidelines	See Table 1	
e.g. Non-conventional (helicopter)	e.g. Implications to timber supply of including "non-conventional" harvest areas in the timber harvesting land base.	e.g. (1) Increased area; (2) Reduced area.	e.g. Increase and reduce non-conventional area by 10%.

4 Model

Provide the following for all models that will be used in the timber supply analyses.

Model Name:

Who developed it and when?

Type: (e.g. simulation, simulated annealing etc.)

Description:

The licensee is responsible for explaining to the Timber Supply Forester how the model applies all assumptions used in the analysis and for explaining results in detail if required. The licensee must provide additional analysis to verify results if these cannot be explained to the satisfaction of the Timber Supply Forester.

In addition to spatially implicit (aspatial) models, spatially explicit (spatial) models are now available for use in timber supply analysis. Additional information detailing the function of these models is necessary to help understand the implications of their use to timber supply projections. This information should include details on the criteria used to aggregate polygons into cutblocks and specify how analysis unit level assumptions are aggregated for application at the cutblock level.

For example, what criteria are used in deciding which adjacent polygons are candidates for aggregation into a cutblock? Do they include age limits? Is there a requirement that only polygons dominated by certain species can be aggregated? Can cutblocks straddle zone boundaries?

In addition, when polygons are aggregated into cutblocks, how are the analysis unit level assumptions such as minimum harvestable age and green-up age determined for the block?

5 Current Forest Cover Inventory

The purpose of this section is to describe the current forest cover inventory, to document all the changes to the inventory that have taken place since the last timber supply analysis, and to describe the process that was followed to obtain review and acceptance by the Forest Service. Results from the Forest Service inventory audit must be included here along with the procedure that will be followed in the analysis to account for any discrepancies uncovered in the inventory audit.

Any inventory adjustments arising from the use of the vegetation resources inventory (VRI) or any other sampling procedures must be described in detail. Licensees should review their proposed adjustment procedures/methods with the Timber Supply Forester and Resources Inventory Branch staff prior to submitting the information package. Examples of VRI inventory adjustment methods are available from the Resources Inventory Branch of the Ministry of Forests (MoF).

The licensee should:

(a) Indicate if the forest inventory conforms to current Forest Service standards and explain any differences.

(b) Describe all the changes that were made to the inventory for this analysis (e.g. were any polygon labels changed? Justification for change.)

(c) Describe the review and approval process followed.

(d) Indicate the date of the original inventory and of updates/re-inventories to any or all components of the inventory (e.g. mature, immature).

(e) Indicate to which date the inventory has been updated for (1) depletion and (2) growth. Which date represents time 0 for the harvest forecasts?

(f) Provide the definition of the age classes that are used in the analysis.

(g) Provide any other information that is necessary for a complete understanding of the inventory and any uncertainties associated with it.

5.1 Vegetation resources inventory issues

Several TFLs have recently conducted either photo-interpreted (phase I) or ground sampled (phase I followed by phase II) Vegetation Resources Inventories (VRI). These inventories provide estimates of the vegetation cover and its attributes using various remote-sensing procedures followed by ground sampling. The initial photo-estimates (e.g. age/height/volume/species, shrub layer etc) are then adjusted by the ground estimates. For more info on VRI procedures see:

http://www.for.gov.bc.ca/resinv/Veginv/home.htm

The methods used in incorporating VRI in timber supply analysis are new and evolving. Licensees should contact the MoF Timber Supply Forester and Resources Inventory Branch staff early in the management planning process to discuss proposed methods with them and ensure the methods is agreeable to all parties.

5.1.1 VRI — land base reduction related issues

Where VRI information is available, cultural features (e.g. non-productive forest, alpine forest, swamp, not satisfactorily restocked (NSR)) must be identified for the analysis using the attributes that are available in the VRI. In the IP the attributes, methods and logic used to identify these features must be described in detail. Licensees should discuss with the Timber Supply Forester what the best approach for identifying these features might be.

5.1.2 VRI — attribute adjustments

In this section the methods used to adjust inventory attributes must be described in detail.

6 Description of the Land Base

6.1 Timber harvesting land base

6.1.1 Timber harvesting land base determination

The purpose of Table 3 is to summarize the area reductions made to the total area of the TFL to arrive at the land base that is available for timber harvesting. The reductions and additions to the total land base must be listed in the order in which they are applied. Each reduction and addition must be described in more detail in the sections following.

Some of the land base and volume reductions and additions listed in the table may not apply to every TFL. Conversely, more reductions or additions could apply to some TFLs. The following table should be used as a guide for designing a table that represents the TFL being analysed. Licensee staff must however be prepared to explain why any of the listed items are missing in their proposal.

Table 3. Timber harvesting land base determination

	Area (hectares)			Volume (m^3)		
	Schedule A	**Schedule B**	**Total**	**Schedule A**	**Schedule B**	**Total**
Total area (incl. Fresh water)						
Non-forest						
Non-productive forest						
Total productive forest						
Less:						
Inoperable/inaccessible						
NC (Non-commercial)						
Low site						
Non-merchantable						
Non-timber resources						
e.g. environmentally sensitive areas (ESA)						
e.g. riparian reserves						
e.g. winter range						
e.g. other						
Specific geographically defined areas						
Unclassified roads, trails and landings (RTLs)						
Total reductions to productive forest:						
Volume reductions (if any)						
Total reduced land base (including ??? hectares of NSR)						
Additions to reduced land base:						
e.g. species conversion						
Timber harvesting land base						
Less:						
Future roads, trails and landings						
Long-term land base						

Please include "Schedule C" lands where they exist.

Note: Boundary revisions since the last timber supply analysis must be accounted for in the total land base. Please explain and quantify the revisions here, if applicable.

6 Description of the Land Base

For each category in the following sections, document the total area in the TFL classified as belonging in the category (including overlapping categories that were deducted earlier in the land base reduction process) and the area that is deducted in the timber harvesting land base determination table (excluding overlapping areas that were deducted earlier in the land base reduction process).

6.1.2 Age class distribution

In Table 4 provide the age class distribution for the TFL.

Table 4. Age class distribution

Age range	Productive area (hectares)			Timber harvesting land base (hectares)
	Productive	Inoperable	Operable	
e.g. 0				
1-20				
21-40				
etc.				
Total				

6.2 Total area

The total area of the TFL must be documented here (including fresh water, excluding salt water).

6.3 Non-forest

Non-forest includes fresh water, snow, ice, rock, alpine, classified roads, camps, etc.

Table 5. Non-forest area

Description	Total area (hectares)
e.g. fresh water	
e.g. classified roads	
Total	

6.4 Non-productive forest

If non-productive forest has been classified in the inventory, include the area information here.

6.5 Inoperable/inaccessible

The purpose of this section is to describe the criteria that are used in defining "inoperable" areas (i.e., areas that are not available for timber harvesting because the terrain is not conducive to timber harvesting (e.g., the terrain is too steep or road access is impossible and the flight distance renders helicopter yarding uneconomic). Some licensees may have classified areas as physically inaccessible to timber harvesting and then used stand attributes from the inventory that are related to the economics of timber harvesting to further reduce the land base to the currently physically and economically operable land base. Whatever the method used, it should be described here in detail with the appropriate reductions applied in the timber harvesting land base determination table. Classification by harvest method will be covered in more detail in Section 10.3.2.

Table 6. Inoperable land base

Criteria (include detailed description below if this space is not sufficient)	Total area (hectares)	Reduction area (hectares)
e.g. Physically inaccessible		
e.g. Classified as inoperable on inventory file		
e.g. No access with current technology		
Total		

Note: Specific areas, such as inaccessible watersheds, should be identified here and excluded from the land base.

Method used to delineate inoperable/inaccessible areas:

e.g., field mapping transferred onto GIS.

6.6 Non-commercial cover

The purpose of Table 7 is to specify the amount of non-commercial cover that exists on the TFL. Timber production on these areas is considered to be unlikely. They may, for example, support non-commercial brush species. If species conversion is occurring on these sites, the management details should be documented in Section 8.8.4.

Table 7. Non-commercial cover

Description	Total area (hectares)	Reduction area (hectares)
e.g. NC brush		
Total		

Note: Total area refers to the entire area covered by this classification including other, overlapping classifications.

Note: Where relevant, describe areas with identifiable differences.

6.7 Low site

The purpose of Table 8 is to document the area that is not suitable for timber harvesting due to its low timber growing potential (i.e., site quality).

In some cases, minimum diameter limits and/or volume per hectare limits are set in conjunction with minimum site index limits. These must be documented in Table 6.14, problem forest types (PFT).

The "area removed" reported in Table 7 should equal the low site reduction reported in Table 3.

Table 8. Low site

Leading species	Site index upper limit	Diameter at breast height (cm) at upper limit of low site	Volume/hectare (m^3/ha) at upper limit of low site	Total area (hectare)	Area (hectare) removed	Volume (m^3) removed	Average volume/ hectare (m^3/ha) removed
Total							

Note: Total area refers to the entire area covered by this classification including other, overlapping classifications.

Note: "Upper" limit applies to the area that is not suitable for harvest. For example: all areas with a site index of less than 15 are not suitable for harvest due to low site quality.

Description:

Describe the process followed in determining the low site reduction. If site class mid-points are used, document the range of the site classes removed.

6.8 Environmentally sensitive areas

Some forest lands are environmentally sensitive and/or significantly valuable for other resource uses. In the past these areas were identified and delineated during a forest inventory and called environmentally sensitive areas (ESAs). The ESA system uses the following categories: soil (Es), forest regeneration problems (Ep), snow avalanche (Ea), recreation (Er), wildlife (Ew), water (Eh) and fisheries (Ef). Two ESA categories are recognized: high and moderately sensitive.

ESA inventories are gradually being replaced by more detailed and current inventories of forest resources. Nevertheless, for some areas and resources the ESA inventory still constitutes the best available information.

In the context of timber supply analysis, ESAs may result in a reduction in harvesting opportunity on these sites. Two strategies to account for this are: per cent area reductions, and the more site-specific evaluation of individual ESA polygons to determine if they should be excluded from the timber harvesting land base.

This section documents the areas that are not available for timber harvesting because they are environmentally sensitive. Table 8 will include areas that were identified as sensitive under the ESA classification system and that were not replaced using a more current and rigorous process. Examples of some more current classification systems follow this section.

Other identified non-timber resources that are not listed in this guide and for which a land base reduction most appropriately reflects management objectives must also be documented in the IP in a similar format to those used below.

The total operable area reduction reported here should equal the ESA reduction reported in Table 3.

Table 9. Area reductions for ESAs

ESA category	ESA description	Total area	Per cent (%) reduction	Area (hectares) reduction		
				Operable	Inoperable	Total
e.g. Er1						
e.g.Er2						
Total						

Note: Total area refers to the entire area covered by this classification including other, overlapping classifications.

Indicate if the ESA inventory conforms to current MoF standards and explain any differences.

6.9 Riparian reserves and management zones — streams

If a comprehensive stream classification inventory is available for all or a portion of the TFL, the area of reserve zones must be calculated in accordance with Table 1 (page 14) of the *Riparian Management Area Guidebook* and excluded from the land base.

Where a stream inventory has not yet been completed for the entire management unit, the area in the riparian reserve zone must be estimated. For example, if local information is available (e.g., surveys of average stream density distribution by class or comprehensive stream inventory of watersheds that are representative of general conditions on the TFL) it may be used to estimate reserve zone areas. Please provide a detailed description of the procedures and assumptions used to compile local estimates. These procedures should be developed in consultation with (and with the agreement of) local Ministry of Environment, Lands and Parks (MELP) staff.

If gullies cover sufficient area to warrant additional land base reductions (in addition to riparian reserves) the method used to identify the gullies, the management strategies and the area affected must be documented in the IP. The format should be similar to the example Table 10 below.

Management practices within the riparian management zone may be reflected in the analysis using several methods. For example, a land base reduction may be employed where the management zone width is reduced using the maximum overall retention percentages documented in Table 4 of the *Riparian Management Area Guidebook* and added to the riparian reserve zone width. Alternatively, where the reserved trees will be replaced with other trees in future harvesting, a volume reduction or a forest cover requirement may be employed.

Current performance in riparian management zones should be reviewed, and in the base case the method that best reflects this performance should be used. Note that while stems may be retained in the riparian management zone, if they do not meet the minimum diameter of trees that are reflected in the yield tables, no accounting should be made for them in the analysis.

In the information package describe in detail the methods used to account for riparian reserve and management zones in the base case and sensitivity analyses.

Table 10. Riparian reserve zones — streams

Location (e.g. zone)	Riparian class	Stream length	Reserve width	Reserve area (hectares)	Management zone width	Reduction per cent (%)	Management zone area (hectares)	Total area deducted (hectares)

Information source:

6.10 Riparian reserve zones — wetlands and lakes

Wetlands and lakes should be identified in accordance with the *Riparian Management Area Guidebook* pages 20 to 28. Tables 2 and 3 of the *Guidebook* must be used to determine the area within the reserve zone.

Licensees will have varying levels of information available for use in the analysis. Please provide a detailed description of the information that is available and how it was used to arrive at the land base reductions for wetland and lake reserve zones.

6 Description of the Land Base

For the Kamloops, Nelson and Prince George Forest Regions, *Lake Classification and Lakeshore Management Guidebooks* are available. Base case assumptions pertaining to the management of lakeshores should be developed considering the guidance provided in these *Guidebooks*.

Table 11. Riparian reserve zones — wetlands and lakes

Location (e.g. zone)	Riparian class	Length of outer edge	Reserve width	Reserve area (hectares)	Management zone width	Reduction per cent (%)	Management zone area (hectares)	Total area deducted (hectares)
	e.g. W1							
	e.g. L2							

Information source:

Description of procedure used to estimate wetland and lake riparian reserve and management zone areas.

6.11 Wildlife habitat reductions

Wildlife habitat may be identified and managed through several processes including the *Identified Wildlife Management Strategy*, identification and approval of ungulate winter range (UWR), and management practices specified in higher level plans.

For many TFLs wildlife habitat that is sensitive to timber harvesting is identified in the ESA inventory. This inventory is gradually being replaced with more detailed and current habitat mapping. Where no new, up-to-date habitat mapping is available, the ESA inventory often constitutes the best available information for the TFL, is being used in forest development planning and should be used to reflect current performance in the base case of the timber supply analysis.

When preparing the IP, the licensee should consult with local Ministry of Environment, Lands and Parks and Ministry of Forests district staff as well as the Timber Supply Forester so that any new information or policy relating to management of wildlife is identified and available for consideration in the timber supply analysis.

Where the habitat occurs over broad geographic areas, land base reductions and/or forest cover requirements may be most appropriately used to model management objectives. The source of the habitat information and the reasons for applying a land base reduction must be documented in Table 12 below. Application of forest cover requirements will be covered under Section 10.2.

Table 12. Estimates for wildlife habitat no harvest areas

Identifying variables (location descriptors)			Wildlife species	Total area (hectares)	Per cent (%) reduction	Excluded area (hectares)

Information Source:

Description of procedure used to estimate wildlife habitat no harvest areas.

6.12 Cultural heritage resource reductions

A cultural heritage resource is an object, the site, or the location of a traditional societal practice that is of historical, cultural or archaeological significance to the province, a community, or an aboriginal people. Cultural heritage resources include archaeological sites, structural features, heritage landscape features and traditional use sites. When these are known, the areas and appropriate protection or management measures must be described in this section. Current practices for protecting these areas must be reflected in the base case assumptions.

Table 13. Cultural heritage resources

Identifying variables (location descriptors)			Total area (hectares)	Per cent (%) reduction	Excluded area (hectares)	Reason for exclusion

Information Source:

Description of procedure used to estimate cultural heritage resource areas.

6 Description of the Land Base

6.13 Other sensitive site reductions

Any other areas that are identified as sensitive to timber harvesting, for which land base reductions most appropriately reflect management objectives and that are not covered under the preceding sections, must be documented in the IP. The source of the information used, the area affected, and the methods used for modelling must be discussed in the IP.

If more current information for sensitive sites that were traditionally identified as ESAs is available, the more current information should be used in the analysis along with modelling methods that properly reflect the management objectives. For example, if a terrain stability classification has been completed, this information should be used in place of soils ESAs.

Table 14. Other sensitive site reductions

Type	Total area (hectares)	Per cent (%) reduction	Excluded area (hectares)	Description
Total				

Information source:

Description of procedure used to estimate other sensitive site reductions.

6.14 Problem forest types

Problem forest types (PFT) stands that are physically operable and exceed low site criteria yet are not currently utilized or have marginal merchantability. These types are wholly or partially excluded from the timber harvesting land base. Examples are balsam, cedar and hemlock stands that contain a high proportion of decadent wood, pine stands with a very high stand density, and deciduous (hardwood) stands.

The purpose of Table 15 is to document the areas that are currently considered to be problem forest types. The land base reductions are usually described according to inventory file attributes (e.g., type group, site index breaks, age, height, stocking, minimum volume per hectare and/or minimum average stand diameter).

Table 15. Problem forest types

Zone/ group	Inventory type group	Characteristics						
		e.g. Age	e.g. Height	e.g. Stocking	Total area (hectares)	Reduction per cent (%)	Area deducted (hectares)	Area remaining (hectares)

Information source and comments:

Note: Where deciduous species cover a significant area and/or where harvesting of deciduous species is an issue, deciduous should be covered under a separate heading. In any case, explain how deciduous reductions are modelled (e.g., do reductions pertain to leading deciduous species types only or to reductions to conifer/deciduous yield tables, etc.).

6.15 Roads, trails, and landings

The purpose of this section is to quantify the area that is, and will be, disturbed by roads, trails, and landings (RTLs). This area is expected to remain non-productive unless all or part of it is permanently deactivated (returned to its original condition). Plans for road deactivation and methods used to model this activity must be included in this section.

Deactivation plans and modelling methods.

6.15.1 Classified roads, trails, and landings

Table 16 describes areas that are currently classified in the inventory as roads, trails, and landings. Usually this area is included in the non-forest land base reduction (see Section 6.3). The information presented here should include a breakdown of the area in each disturbance category (i.e., roads, trails, landings). This information may assist in providing estimates for unclassified and future roads, trails and landings.

Table 16. Classified roads, trails, and landings

Location e.g. zone e.g. group	Total area (hectares)		
	Roads	Trails	Landings
Total			

Information source:

6.15.2 Unclassified roads, trails, and landings

The purpose of this section is to document the area that is occupied by roads; trails and landings that are not classified in the forest cover inventory. The source of the information and method used to estimate this reduction must be documented in the IP.

In some areas it may be warranted to localize the reductions to broad age classes or zones or groups. For example, large unroaded fire origin immature areas should not have existing road reduction percentages applied. Conversely, access to cutblocks often run through old-growth areas where a land base reduction may be warranted.

For all road reductions the road length and width (often by road class or category) used to estimate the area must be provided. The criteria used to determine road width need to be described. Sufficient information must be provided to allow easy review and validation by Forest Service staff of this land base reduction.

The method used to derive landing area estimate must also be described.

If road deactivation (re-contouring) is current practice, information detailing roads deactivated in the past and projected to be deactivated in the future should be included in the IP and accounted for in the analysis. The method, or information source used to derive a productivity reduction for the area of restored roads must be described.

Table 17. Road classification

Road class	Road length (kilometres)	Road width (metres)	Area (hectares)

Table 18. Unclassified roads, trails, and landings

Location e.g. zone e.g. group	Total area (hectares)			Deactivated area (hectares)			Reduction per cent (%)	Area deducted
	Roads	Trails	Landings	Roads	Trails	Landings		
Total								

Information source:

Method used to estimate area or per cent reduction.

6.15.3 Future roads, trails, and landings

Table 19 includes the area of all roads, trails, and landings that will be constructed in currently undeveloped areas (mature and immature).

The reduction may be applied as a per cent reduction equally against all stands that will be disturbed in the future, or as an area reduction to each analysis unit, zone, group, broad maturity class or specific area.

If there are no plans to deactivate roads and restore them to some productive capacity, stands will provide harvest volume on the first entry but not on further entries. Plans for deactivation should only be included in the base case if a road deactivation program is currently in place on the TFL. Road deactivation performance information should be provided to support the modelling assumptions.

The method, or information source used to derive a productivity reduction for the area of restored roads must be described.

The area contributing to the long-term harvest level is net of the area that will be covered by roads in the future.

Table 19. Future roads, trails, and landings

Location e.g. zone e.g. group	Total area (hectares)			Deactivated area (hectares)			Reduction per cent (%)	Area deducted
	Roads	Trails	Landings	Roads	Trails	Landings		
Total								

Information source:

Method used to estimate area or per cent reduction.

6 Description of the Land Base

6.16 Exclusion of specific, geographically defined areas

The purpose of this section is to document the location and total area to be excluded from the timber harvesting land base to account for any area-specific exclusions that are part of current forest management. This reduction includes, for example, parks or wilderness areas designated by Order-in-Council that are not already accounted for on the inventory file.

While areas recognized in legislation or by Order-in-Council as not contributing to the timber harvesting land base may be excluded, areas which have been deferred from harvesting because they are contentious or are under study (e.g., planning deferrals, potential parks) should not be considered unavailable for timber harvesting in the base case. The ramifications of these potential land base reductions may be explored in other timber supply options or sensitivity analyses.

Table 20. Exclusion of specific, geographically defined areas

Identifying variables (location descriptors)			Excluded area (hectares)	Reason for exclusion

Information source:

Method used to estimate area reduction.

6.17 Any other land base exclusions

The purpose of this section is to specify the location and total area to be excluded from the timber harvesting land base for any other resource concerns that are most appropriately accounted for through land base reductions. The information source and the method used to estimate the area, as well as any other information that is pertinent to modelling these assumptions, must be included in the IP.

6.18 Area additions

The purpose of this section is to document areas that are added into the timber harvesting land base immediately or at some time during the forecast period. A common example of this is the regeneration to conifers ("rehabilitation") of areas that were deducted in Table 3, "Timber harvesting land base determination," as non-commercial cover.

Table 21. Area additions

Reason for area addition	Analysis unit	Timing of addition	Area (hectares)
Total			

Information source·

Method used to estimate area addition.

7 Inventory Aggregation

7.1 Management zones and multi-level objectives (groups)

This section describes the criteria and rationale used in delineating areas that are subject to unique forest cover objectives (e.g., areas with specific forest cover objectives to satisfy wildlife habitat, visual quality objectives (VQO), biological diversity requirements, etc.). In most management units, specific areas may be subject to one or more (or no) overlapping forest cover objectives. The actual forest cover constraints applied are discussed under Section 10.2, "Forest cover requirements."

In order to approximate multi-layer objectives the following approach was used in the Forest Service model FSSIM. One or more unique, mutually exclusive zones must cover the entire management unit area. Each of these zones may be subject to a maximum disturbance; a minimum older forest or no forest cover requirement. For example, these constraints are suitable for modelling visual quality objectives and wildlife habitat objectives.

In addition to the zonal level of constraints, additional levels may be applied to any or all areas of the unit. This function of the model provides complete flexibility in combining any areas on the inventory input file ("groups" in FSSIM terminology) and subjecting them to constraints such as forest cover requirements, area harvest targets and volume harvest targets. This level of constraints is suitable, for example, for modelling landscape level biodiversity requirements and harvest targets in problem forest types.

Other models used in B.C. will likely use a different approach with similar results. Due to the increasing amount and complexity of the information that will be generated from timber supply models, it is essential that the procedures used and the information generated is clearly documented and explained in the IP and timber supply analysis report.

7 Inventory Aggregation

Table 22. Zones and groups

Zone/ group	Name	Total area	Net area	Criteria used to delineate zone/group				Rationale/comments
Zone 1	e.g. VQO partial retention			e.g. Highway corridor e.g. All polygons classified as P.R. VQO				e.g. Mapped by ___as per regional/provincial landscape guidelines dated June 30/92
Zone 2	e.g. Deer			e.g. Fir leading	e.g. ≥ age class 4			e.g. Regional/habitat guidelines dated Dec. 31/91 were followed
Zone 3	e.g. Normal management			e.g. All areas not covered by other zones				e.g. Normal management included 4-pass system with 15 year green-up to account for adjacency constraints
Group 1	e.g. Caribou			Caribou area				e.g. Instructions in letter from MELP, regional habitat biologist, dated Feb. 14, 1993, were followed
Group 2	e.g. Landscape unit (LU) 1			Koch Creek watershed				

Note: See Section 10.2, "Forest cover requirements."

Information source:

Method used to delineate zones and groups.

7.2 Analysis units

In order to reduce the complexity and volume of information used and generated in timber supply models, individual stands may be aggregated into fewer, larger and more or less homogeneous units called analysis units. They are usually comprised of combinations of stands with similar tree species, timber growing capability (site index) and sometimes silvicultural management regimes. Yield tables representing the growth of trees on each polygon within the analysis unit are combined to represent the area weighted average growth of stands on the unit. Yield tables for currently existing and future regenerated stands are developed using this method.

Often it is warranted to assign analysis units to specified age ranges for a given species/site class combination. For example, when the site index assigned to old-growth stands in the inventory does not reflect the growth potential expected for thrifty stands, analysis units may be created for each of the old-growth and thrifty components of the species/site range combinations. For example, analysis units may be developed for young stands (0 to approximately 30 years, thirty (approximately 30 to 140 years) and old, (141 years and older).

7 Inventory Aggregation

It may also be warranted to create separate yield tables for similar analysis units in different zones in which they occur. For example, analysis unit fir good in zone A may consist of areas with an average site index that is lower than analysis unit fir good in zone B. For this reason it may be preferable to define two analysis units for fir good, one for zone A and one for zone B.

Please describe in detail the methods used and reasoning behind the aggregation of the inventory into analysis units. It may be necessary to provide several tables to describe analysis units for mature stands, thrifty stands, existing managed stands and future regenerated stands.

Table 23. Analysis units

Zone/ group	Analysis unit (# and name) e.g.	Net area	Site index	Variable used to define analysis unit				Rationale used or comments[a]
				Species/ type group	Site index range	Age range	Etc.	
e.g. VQO partial retention	1) S/F GMP 2) Pl GM 3) Pl P			S/F	G (SI 35+)			
e.g. Wildlife	4) S/F GMP 5) Pl/ GMP 6) C/H GMP							
e.g. Caribou	7) All						Entire Caribou zone	
e.g. Normal management	8) S GM 9) S P 10) F GM 11) F P 12 Pl GMP 13) C/H GMP							

(a) The rationale used to define the analysis unit may be obvious based on the variables that were used to define each analysis unit. This column should contain, for example, descriptions of areas that do not fit the criteria of the analysis unit but were aggregated into the analysis unit due to the small size of the area.

Information source:

Description of methods used.

7 Inventory Aggregation

7.3 Detailed land base information requirements

Please provide the Timber Supply Forester with the detailed inventory file (digital ASCII format) created after the determination of the timber harvesting land base for the base case. This file will include polygon specific information on both the area within the timber harvesting land base and the area deducted from the total land base to arrive at the timber harvesting land base. This information will enable the Timber Supply Forester to review the land base reductions applied.

For the base case provide the Timber Supply Forester with the entire timber supply model input and output files (digital ASCII format).

All files must include detailed field descriptors.

Similar information to the above for other options or sensitivity analyses may be requested by the Timber Supply Forester should she/he consider it necessary to gaining a better understanding of the timber supply on the TFL.

The Timber Supply Forester may generate reports from the files provided or request summary reports from the licensee to provide Forest Service field staff with information they may need to provide effective input into the evaluation of the IP.

8 Growth and Yield

This section will be forwarded to Resources Inventory and Research Branch staff for their review and acceptance. Acceptance of the growth and yield information is a requirement and must be obtained before proceeding with the analysis.

8.1 Site index

8.1.1 Site curves

Describe the site curves used for all species and age groups.

Table 24. Site index source

Species	Source
e.g. Amabilis fir	Kurucz (1982)

If any site index curves are not the accepted Ministry of Forests' standard, please explain the rationale for using alternate curves. Research Branch staff must accept alternate curves.

8.1.2 Site index adjustments

Any adjustments to old-growth site index (OGSI) (e.g., paired plot, vet study, site index biogeoclimatic ecosystem classification (SIBEC)) in the base case, an option or a sensitivity analysis must be explained in detail. Research Branch staff must accept adjustments to old-growth site indexes in the base case. The methods used and the magnitude of old-growth site index adjustments for another option or sensitivity analysis should also meet with Research Branch staff's approval.

Table 25. Site index adjustments

Species	Age range	Inventory site index	Adjusted site index	Area (hectares)
e.g. Fd	0–30			
	31–140	12	12	
	140 +	e.g. 12	e.g. 15	

Information source and methods used:

Provide a detailed description of the information source and methods used.

8 Growth and Yield

8.2 Utilization level

The utilization level defines the maximum height of stumps that may be left on harvested areas, and the minimum top diameter (inside bark) and minimum diameter at breast height (dbh) by species of stems that must be removed from harvested areas. These factors are needed to calculate merchantable stand volume for use in the analysis. The level documented here is the utilization level currently applied in operations. Please include the firmwood standard where it is not equal to 50%.

Table 26. Utilization levels

Species	Utilization			
	Minimum dbh (cm)	Maximum stump height (cm)	Minimum top dib (cm)	Firmwood standard (%)

8.3 Decay, waste and breakage for unmanaged stands

Table 27 documents the decay, waste and breakage factors by species that are applied to unmanaged stand yield tables to obtain net volumes per hectare.

These factors should be derived using Ministry of Forests' procedures. If they are not standard Ministry of Forests' loss factors, please provide a detailed explanation of how they were derived.

Decay, waste and breakage factors must be approved by Resources Inventory Branch staff in conjunction with the review of the unmanaged stand yield tables. Contact Resources Inventory Branch, Growth and Yield Section, to discuss proposed methods of determining factors and information requirements for the review of the proposed factors.

Table 27. Decay, waste and breakage factors for unmanaged stands

Forest inventory zone (FIZ)	Public sustained yield unit (PSYU) or local	Utilization level (cm dbh)	Age range	Factor by species (%)				
			< 80, 81–120, > 121	F	C	H	B	→ etc.

Table 28. Sources of decay, waste and breakage factors

Factor	Species	Source

8.4 Operational adjustment factors for managed stands

In this section, describe all operational adjustment factors (OAF) that need to be applied in order to reduce potential yields generated by growth and yield models (e.g., TASS) to operational yields.

The default factors most commonly used in B.C. today are an OAF 1 of 15% and an OAF 2 of 5%. OAF 1 includes accounting for openings in stands (~ 4%), distribution of stems or clumpiness (~ 4%), endemic pests and diseases (~ 4%), and other risks to potential yield (~ 3%) for a total of 15%.

OAF 2 is applied to account for decay, waste and breakage. The 5% factor originates from estimates for older immature stands documented in the *1976 Metric Diameter Class Decay, Waste and Breakage Factors*. OAF 2 is applied after OAF 1 and increases over time from 0 % at time 0 years to 5% at index age 100 years. It increases linearly at this rate (10% at 200 years, 15% at 300 years etc.).

Where better information is available, one or more components of OAF 1 may be adjusted or addressed as a custom OAF, etc. Documentation supporting the proposed adjustments must be included in the information package.

Please include the following information:

- the magnitude of each factor;
- the yield table to which each factor applies;
- the components that make up each factor;
- the source of the factors; and
- data to justify the magnitude of the factors (if not the accepted MoF standard).

Note that the Resources Inventory Branch of the MoF is currently developing a stand level decay model that will be available for use with the managed stand yield tables. When this model is available, one or both of the standard OAFs discussed above may be modified or replaced by information generated from the decay model.

This information must be reviewed and accepted by Research Branch staff in conjunction with the managed stand yield tables.

8.5 Volume reductions

Table 29 documents other volume reductions by species, such as reductions to existing stands where they are deemed to be excessively decadent, or where a species will not be harvested in mixed stands (e.g., deciduous, larch in a spruce larch stand).

Table 29. Volume reductions

e.g. Leading species e.g. Analysis unit e.g. Type group	Problem species	Volume (m^3/hectare)	Per cent (%)
Total			

Explain how this reduction is modelled.

8.6 Yield table development

This section details the methods used to produce the yield tables that will be used in the timber supply model to represent timber yield over time for each analysis unit. These may be derived by generating yield tables for each polygon and area weighting them to form an aggregate table. Another method is to area weight the attributes used in generating yield tables and use the resulting attributes to produce the aggregated yield tables. Whichever method is chosen, it must be clearly described to facilitate the review by Forest Service staff.

Methods used:

Note: All yield tables, must be included as an appendix to the final analysis report. They must also be submitted in digital form to facilitate the review of the analysis.

8.7 Yield tables for unmanaged stands

The following sections describe the source and methods used to develop yield tables for unmanaged stands. These yield tables will be reviewed and must be accepted by Resources Inventory Branch staff prior to proceeding with the analysis.

8.7.1 Existing mature timber volumes

The purpose of this section is to describe how existing mature timber volumes (old growth) are derived.

Age Class (or age): e.g. > age 140

Description: e.g. existing mature (old growth) timber volumes are derived from the yield tables for each analysis unit.

e.g. existing mature (old growth) timber volumes are derived using area weighted inventory plot volumes for each analysis unit.

8.7.2 Yield tables for unmanaged immature stands

This section describes the methods used to develop yield tables for currently existing and future regenerated unmanaged stands. These tables may be developed differently for different age ranges, depending on the detail of information available in the inventory.

8 Growth and Yield

Please describe in detail the source of the information, the growth and yield model and the methods used to derive these yield tables.

Source:

Methods used.

8.7.3 Existing timber volume check

In order to verify that no errors were made in aggregation and that no significant aggregation bias exists, the total volume of the current (starting) inventory using polygon specific inventory volumes should be compared to the total volume of the current inventory using analysis unit volumes assigned to each polygon in the analysis. If the difference seems unreasonable, the aggregation methods should be reviewed to determine the cause of the difference.

Please describe in detail the methods used to calculate the total inventory volume using polygon specific information and analysis unit information. Table 30 may be expanded to show more detailed information such as volume by age class or by analysis unit and age class.

Table 30. Existing timber volume check

	Polygon volume derived using:		Per cent (%) difference
	Inventory volume	Yield table (AU) volume	
Total volume (m^3)			

8.8 Yield tables for managed stands

The following sections describe the source and methods used to develop yield tables for managed stands. These yield tables will be reviewed and must be approved by Research Branch staff prior to proceeding with the analysis.

8.8.1 Silviculture management regimes

The purpose of this section is to describe in detail how the yield tables are developed to reflect each silvicultural management regime within an analysis unit. When reviewing the growth and yield information submitted here and in Appendix I, Research Branch growth and yield staff may attempt to recreate the proposed yield tables. Sufficient information must be included in this IP to enable them to accomplish this.

Silviculture performance information must be provided to support the management regimes that will be modelled in the base case.

Table 31 is an example of the kind of information that is required. Note that site index assignment for each species is described in Section 8.1.

8 Growth and Yield

Table 31. Silviculture management regimes

Analysis unit	Area (hectares)	Leading Species	Second species	Weighting (%)	SI	Establishment density (stems/hectare)		Regeneration delay		Management	
Number/ name						Natural	Planted	Natural	Planted	e.g. Spacing (stems/h a @ age)	
e.g. 1		Fd	Cw	80/20	27	3000	1600		2	750 @ 20	
										750 @ 20	

Information source and description (e.g., growth and yield model used).

Methods used:

8.8.2 Regeneration delay

Regeneration delay is the time elapsed between harvesting and the establishment of a new stand of trees. The end of the regeneration delay is time zero for a yield table; it is the point in time when stand growth begins. The age of the seedling should be included in the estimate of regeneration delay. This may be accomplished either in the growth and yield or the timber supply model, however care must be taken not to double count the age of the seedling.

This section describes the source of the regeneration delay information included in Table 31, above.

Regeneration delay must be included in the time elapsed before the required green-up condition is attained that allows harvesting of adjacent areas. This will be covered in more detail under Section 10.2, "Forest cover requirements."

Source of information:

Describe how the regeneration delay is applied (e.g. in the yield tables, in the timber supply model, etc.).

8.8.3 Regeneration assumptions

This section describes how analysis units are regenerated after harvesting (i.e., to which analysis unit (or yield table) is each area regenerated following harvest). Table 32 is an example of the kind of information to be included in this section.

Often areas currently covered by one tree species are planted to another species after harvesting. On the same area, the site index for one species is usually different than the site index for another species (contact Dr. Gordon Nigh at MoF Research Branch for further information). If species conversion is occurring, the method used to adjust the site index for each species must be described in detail.

Table 32. Regeneration regime

Existing analysis unit	Regenerated analysis unit(s) per cent allocation					
Name/number	BG/101 (n)	BG/102 (p)				SG/109 (p)
Bl Good/1	25	25				50
S Good/9						100

Describe the modelling methods used when applying the regeneration assumptions:

Describe site index changes associated with species conversions. Include the site index conversion equations, the converted site index and the site index of the analysis unit to which the existing analysis units are being regenerated.

8.8.4 Stand rehabilitation

The purpose of Table 30 is to document how the conversion of non-merchantable or less desirable forest types (e.g., deciduous, stocking class 4 Pl, etc.) to merchantable forest types will be modelled.

Table 33. Stand rehabilitation

Existing analysis unit	Total area (hectares)	% to be treated	Area to be treated (hectares)	Conversion schedule (hectares/decade[a])						Analysis unit regenerated to	Yield table regenerated to	Site index change[b]
				1	2	3	4	5	6			

(a) Provide the area that will be converted each decade. If species conversion is modelled differently, provide a detailed explanation of the methods used.

(b) Document the site index change (if any) in converting from the existing analysis unit to the regenerated analysis unit. Provide documentation that proves that the site index change actually occurs. Research Branch staff will review this information.

Provide an account of the history of species conversion on the tree farm licence, including area treated and rate of treatment (i.e., hectares/year).

Describe in detail the methods and attributes used in generating these managed stand yield tables.

8.8.5 Genetic improvement

In this section describe the application of yield adjustments to account for the use of genetically improved planting stock.

Include an account of the historic and current use of genetically improved stock on the TFL. Describe the availability of the improved stock for the TFL and the likelihood that it will be available in the future (e.g., list any seed orchards owned by the licensee or agreements with seed orchards to obtain improved stock over time).

Describe in detail how the genetic worth is applied in the yield tables or the timber supply model (e.g., applied in Table Interpolation Program for Stand Yields (TIPSY) or as an OAF or as a site index adjustment).

8 Growth and Yield

Describe when during the forecast period genetic gains will be applied and provide justification for the timing.

Table 34. Genetic worth

Species	Seedlot number	Genetic worth	
		1st generation	2nd generation

Description/justification:

Methods:

Note: The genetic worth of each seedlot can be obtained from the Forest Genetics Section at Research Branch.

8.9 Silviculture history

8.9.1 Existing managed immature

The purpose of Table 35 is to document, for each analysis unit, the area by age class of existing managed second-growth stands within the TFL.

Table 35. Immature management history

Analysis unit		e.g., Natural (hectares) age class			e.g. Planted (hectares) age class			e.g. Spaced (hectares) age class			Total area (hectares)
#	Name	1	2	3	1	2	3	1	2	3	
1	FG										
2											
3											

Note: Add further age classes if required.

Explain how these stands are accounted for in the analysis (i.e., are they grown on MSYTs? How was site index assigned?). Assumptions made in the analysis about the history of management on the TFL must be supported with evidence (i.e., performance statistics).

Comment on current silviculture management performance relative to any silviculture treatments applied in the managed stand yield tables used in the base case.

8.9.2 Backlog and current non-stocked areas (NSR)

Backlog NSR is any area that was denuded prior to 1987 (when basic silviculture became the obligation of the licensees) and is not yet fully stocked. All other NSR is current NSR.

Table 36 documents the areas in the timber harvesting land base that are backlog and current NSR and specifies how and when these areas will be regenerated.

Table 36. Backlog and current NSR

Original analysis unit	Analysis unit regenerated to	Backlog NSR		Current NSR		Total area (hectares)
		Area (hectares)	Years until stocked[a]	Area (hectares)	Years until stocked	
1						
2						
Total						

(a) This column could alternatively be titled "Rate of restocking (hectares/decade)" or "Regeneration schedule" with the column subdivided into decades.

Note: If inoperable NSR exists on the TFL, please include a similar table describing this area and discuss plans for management if any.

Provide an account of the history of current and backlog NSR area regeneration, including the area regenerated each year.

Describe the method used to assign site index to the NSR area.

Describe the logic used when assigning NSR to analysis units.

Describe in detail how and when NSR is regenerated in the timber supply model. What age is assigned to NSR areas in the model?

9 Protection

9.1 Unsalvaged losses

This table quantifies unsalvaged (timber) losses occurring due to natural causes. It includes epidemic losses to insects and disease, and losses to fire and blowdown. When modelling timber supply, the unsalvaged losses estimate is usually added to the desired harvest requested for each decade ar. , then subtracted from the forecast upon completion of the modelling exercise.

Unsalvaged losses have generally been applied as a factor covering the entire unit. While often no better information is available, where it is, unsalvaged losses may be applied on a location specific and/or species specific basis.

Since unsalvaged losses are applied over the long term, the average loss should be derived from long-term historic data. The objective is to include in the average annual estimate, events that are known to occur periodically (e.g., 50-year storm events).

Unsalvaged losses estimates should be derived from local information, and not taken from assumptions made for adjacent management units.

Table 37. Unsalvaged losses

Location (zone, analysis unit)	Cause	Gross losses (m^3/year)	Volume salvaged (m^3/year)	Unsalvaged loss (m^3/year)
	Fire			
	Insects (Epidemic)[a]			
	Disease (Epidemic)[a]			
	Windthrow			
	Other			
Total				

(a) Endemic losses are reflected in the yield tables.

Describe how the unsalvaged loss figures were derived (e.g. time frame, major outbreaks included, etc.).

Include information detailing the extent of salvage operations.

10 Integrated Resource Management

10.1 Forest resource inventories

During the term of each management plan information and policies may change. As a result it seems reasonable to review and sometimes change the inventory information available for the timber supply analysis, including information that was deemed to be adequate for the last timber supply analysis. Having each of the inventories reviewed and accepted by the appropriate agencies prior to submitting the information package often reduces the number of questions and changes to the package requested by the agencies.

The purpose of this section is to document the status of all forest resource inventories. Indicate what standard was used to complete each inventory, the date of completion or update, and approvals obtained.

Table 38. Forest resource inventory status

Forest resource inventory	Standard	Date completed/ updated	Date approved	Approved by	Status
e.g. Landscape					
e.g. Recreation					
e.g. Range					
e.g. ESA					
e.g. Stream					
e.g. Wildlife					
Other					

Note: If more space is required to explain standards, etc., please change the format to include the information.

10.2 Non-timber forest resource management

10.2.1 Forest cover requirements

Management strategies for specific forest resources can often be expressed in terms of maintaining a desired age distribution of the forest cover. For example, stands on harvested areas must have aged to meet and surpass a critical green-up age before adjacent stands may be harvested. Forest cover requirements may also be applied to ensure that a portion of an area is covered with stands older than a certain age (e.g., to maintain old growth) or with stands within a specific age range (e.g., to maintain thermal cover for wildlife).

It may be necessary or desirable to manage for two or more different forest related resources on the same area. As noted in Section 7.1, currently available timber supply models are designed to account for overlapping forest cover constraints. For example, landscape unit level old seral objectives may overlap portions of areas where visual impacts will be managed.

With the requirement to retain different forest characteristics across the landscape, it is important to identify if productive forest outside of the timber harvesting land base might contribute to the area needed to satisfy a forest cover requirement (i.e., maximum allowable disturbance or minimum area retention).
Forest cover requirements may be expressed as follows:

- a maximum area (or per cent area) (timber harvesting land base or productive) that may support stands younger than age X (or shorter than height Y).
- a minimum area (or per cent area) (timber harvesting land base or productive) that must support stands older than age W (or taller than height Z).
- a minimum area (or per cent area) (timber harvesting land base or productive) that must support stands between age U and age W.

If necessary, all types of forest cover requirements may be applied at the same time to the same zone, group or analysis unit.

Some common forest resource values for which management can be expressed in terms of cover requirements are: Visual resources, ungulate winter range, landscape unit level biodiversity objectives, and green-up requirements for cutblocks before adjacent cutblocks may be harvested.

10.2.1.1 Green-up

Age to green-up can impact harvest-scheduling opportunities based on minimum green-up height requirements as identified in the *Forest Practices Code of British Columbia Act* (as outlined in the *Operational Planning Regulation* Section 68). The age to green-up is an important operational scheduling parameter and a key element in timber supply analysis. Green-up is used as a measure of tree height and site occupancy to meet visual, hydrological, wildlife or other objectives. Achievement of green-up height is required before adjacent areas may be harvested.

Height-age curves (e.g., site tools) have been used for timber supply analysis to approximate the age at which green-up heights are achieved. Recently the MoF prepared the document *Age to Green-up Height: Using Regeneration Survey Data*. It provides height-versus-age estimates by site index derived from data available in the Integrated Silviculture Information System (ISIS) along with a comparison of these green-up ages to those derived by site tools.

The information in the document should be considered for use in timber supply analyses. Where sufficient data was available (see *Age to Green-up Height: Using Regeneration Survey Data*, Appendix 4) to project reliable estimates of age to green-up, and where no better local information is available, the information in the document should be used. Otherwise, site tools or similar height age relationships may be used to determine age to green-up.

10.2.2 Visual resources

The *Procedures for Factoring Visual Resources into Timber Supply Analyses* (REC-029) were updated in March 1998. These procedures should be consulted when determining appropriate forest cover requirements to apply for visual resources in the base case.

Usually visual resources are managed on areas that are known to be visually sensitive to disturbance. In time the intent is to "make known" scenic areas and establish visual quality objectives (VQOs) for them under the *Forest Practices Code* (FPC) throughout the province.

Currently the processes for identifying scenic areas are at various stages of completion. As described on page 3 of the "procedures", for some districts scenic areas have been made known and VQOs established by the district manager or a planning process (e.g., higher level plan). For some districts scenic areas have been made known but VQOs have not yet been established. For some the landscape inventory has been completed but no scenic areas have been identified and made known. Nevertheless, in many of these areas visual resources are being managed, in some cases in accordance with a "district manager policy" letter or commitments made in the management plan.

For the base case the legally established objectives, and/or the on the ground current performance, and/or the district manager guidance and the commitments made in the management plan must be reviewed to determine the basis upon which visual resources are being managed on the TFL. The basis for this management must be described and if possible supported with documentation in the IP (attach any relevant instruction letters as an appendix to the IP). Strategies to "buy back" timber supply must be explained and any impacts must be quantified in the analysis (i.e., by comparing the base case with a relevant sensitivity analysis).

Sensitivity analysis is warranted where uncertainty about visual resource management practices exists.

Visually effective green-up heights should be determined using the procedures described in Table 6, of the report, *Procedures for Factoring Visual Resources into Timber Supply Analyses* (REC-029) or based on current performance (operational approvals) or on direction from a planning process or the district manager.

Table 39 is intended to describe the breakdown of the scenic area into VQO areas and the forest cover requirements that will be applied for each VQO. More detail may be required where the VQO for each visual sensitivity unit (polygon) is accounted for separately.

Table 39. Visual resources

VQO	Productive (hectares)	Timber harvesting land base (hectares)	Green-up height (metres)	Green-up age (years)	Allowable denudation per cent (%)
e.g. retention			e.g. 4	e.g. 22	e.g. 5%

Please describe the rationale and method used to determine the areas and percentages documented in Table 39. It may be beneficial (and expedite the review process) to append a worksheet detailing the information (e.g., area within each visual absorption capability (VAC), methods and calculations used to derive the green-up heights and ages and the allowable denudation per cent.

Where no local data for determining the visually effective green-up age is available, the Ministry of Forests publication *Age to Green-up Height: Using Regeneration Survey Data* (June 2000) should be used.

10.2.3 Recreation resources

Recreation objectives may be identified in a higher level plan (e.g., landscape unit objectives or recreation site, trail or interpretative forest site objectives) or through the district manager making recreation features "known". Often, the best available information describing the recreation resource is the ESA inventory (see Section 6.8).

Where recreation objectives are best represented in the model by the application of a forest cover requirement, please include in this section the rationale and the methods used in modelling the objectives.

10.2.4 Wildlife

10.2.4.1 Ungulate winter range

Ungulate winter ranges are areas that have been "identified as being necessary for the winter survival of an ungulate species". These areas may be identified through a higher level plan, the chief forester and deputy minister of the Ministry of Environment, Lands and Parks under *Section 69* of the *Operational Planning Regulation*, a wildlife management plan or strategy approved before October 15, 1998 by the district or regional manager and the designated environment official, the chief forester or by the ministers.

The management objective for ungulate winter range typically includes the maintenance of thermal cover and/or old growth. In the model, this may be accomplished by removing the identified area from contributing to timber supply (see Section 6.11, "Wildlife Habitat Reductions") or by applying forest cover requirements. Thermal cover is usually provided by stands that average a certain tree height. Thus, the forest cover requirement is expressed in terms of a minimum amount of the area identified as ungulate winter range being covered with stands that are within a certain age range, a surrogate for stand height.

In this section please describe the process that led to the identification and approval of the ungulate winter range and the rationale/method/agreement(s)/report(s) that was used in determining the forest cover requirement for winter range. Provide details on the area delineated as ungulate winter range (total, productive and timber harvesting land based) and describe (in tabular format and/or text) any land base reductions and the forest cover requirement that will be applied to this area.

Where the process for identifying ungulate winter range is incomplete, the effect on timber supply of managing the ungulate winter range (based on the best information available at the time the analysis is completed) should be investigated using sensitivity analysis.

10.2.4.2 Identified wildlife

Identified wildlife are managed through the establishment of wildlife habitat areas (WHA) and implementation of general wildlife measures (GWMs), or through other management practices specified in higher level plans. The procedures for establishing WHAs are described in *Managing Identified Wildlife: Procedures and Measures, Volume I,* February 1999.

Three species identified in the *Identified Wildlife Management Strategy* are dependent on habitat requirements that cannot be managed solely through WHAs because they have large home ranges, occur at low densities, have widely and sparsely distributed limiting habitats, or are sensitive to forest level disturbances. These species are called "higher-level plan species" and include bull trout, fisher and grizzly bear. Management strategies for these species will most often flow from higher level plans.

As described in Section 6.11, forest management in the habitat of some wildlife species may best be accounted for in the model using forest cover requirements. In this section tabulate the identified wildlife species (including the higher-level plan species) that exist or may exist on the TFL. Include the area of established WHAs and describe the GWMs that apply. Also describe any objectives or management strategies prescribed for the higher-level plan species.

Often, identified wildlife species have been sighted on a management unit and current management includes protection of their habitat (e.g., Queen Charlotte goshawk nesting sites), even though WHAs have not yet been established. The licensee should discuss with MELP staff and the Timber Supply Analyst whether accounting for the management of these areas should be included in the base case or a sensitivity analysis.

Explain the methods that will be used in the timber supply model to account for these measures and tabulate the forest cover requirements that will be applied in the base case and any proposed sensitivity analyses. The information provided should include the amount of area managed for the species of concern, the location or identification of the area (e.g., zone, group), and any land base reductions, volume reductions and forest cover requirements applied. This information should be presented in a table if possible.

10.2.4.3 Caribou

Generally areas are identified for caribou management during the Land and Resource Management Planning (LRMP) process. This process is at various stages of completion for different areas of the province. Until the LRMP covering the TFL is completed and higher-level plan objectives for caribou management are signed off, draft management strategies may be in place.

In this section describe the status of planning for caribou management. Include an account of current caribou management practiced on the TFL and, if available, in an appendix provide any instructions issued by the district manager detailing her/his expectations for the management of this species.

In a table and/or text, provide information detailing the extent of the area being managed for caribou, in terms of total land base, productive forest and timber harvesting land base. Explain what forest cover requirements are deemed to be necessary and explain how these will be reflected in the base case and/or in any planned sensitivity analysis.

10.2.5 Adjacent cutblock green-up

The purpose of this section is to describe the current operational requirements for "green-up" of a cutblock before adjacent cutblocks may be harvested. To attain green-up conditions, the harvested block usually must be covered with stands of a certain height. In the timber supply model the stand height requirement is often expressed in terms of the time needed to attain the height (green-up age). Finally, the adjacent cutblock green-up constraint (or adjacency constraint) is expressed in terms of the percentage of an area that may be covered with stands aged less than the green-up age.

The area that is subject to the adjacency constraint is that portion of the timber harvesting land base (not the productive land base) where harvesting is not otherwise constrained by non-timber resources. This area is often named the Integrated Resource Management zone (IRMZ) or the General Forest Management zone. Areas where harvesting is otherwise constrained by non-timber resources where the constraint is less than the adjacency constraint should be included in the area subject to the adjacency constraint.

Describe the rationale/method used to determine the number of years after a block is harvested before adjacent cutblocks may be harvested and the amount of area that may be covered with stands less than the green-up age (or height).

As described in Section 10.2.1.1, where no local data for determining the green-up age is available, The Ministry of Forests publication *Age to Green-up Height: Using Regeneration Survey Data (June 2000)* should be used.

If a spatially explicit model will be used for the analysis, refer to section 4 for examples of the kind of information needed to explain how adjacency issues are managed in the model. The analyst must have a thorough understanding of the function of the model and must be able to explain in detail how adjacency issues (and forest cover requirements in general) are addressed in the model.

10.2.6 Biodiversity

The *Landscape Unit Planning Guide* (LUPG) was released in March 1999. It consolidates prior direction and information for biodiversity management. It presents new techniques and procedures to implement landscape unit planning and should be consulted when developing the biodiversity assumptions that will be used in the base case and sensitivity analyses. The retention of old growth and wildlife trees (WTs) is the current priority for landscape unit planning.

10.2.6.1 Landscape-level biodiversity

The intent of this section is to describe the procedures to be used for incorporating landscape units (LU) and biodiversity emphasis options into the timber supply analysis. The background section below includes excerpts from the *Landscape Unit Planning Guide*. These should be considered when developing landscape level biodiversity assumptions for the base case.

Background

Chapter six of the *Landscape Unit Planning Guide* describes the process to be followed when establishing LU boundaries and objectives. Currently draft LUs, and in many cases draft biodiversity emphasis options (BEO) are in place throughout the province. In some areas LUs and BEOs have been established pursuant to Section 4(1) of the *Forest Practices Code of B.C. Act*.

As described above, the retention of old growth is one of the two current priorities for LU planning. In accordance with the *LU Planning Guide (Chapter 3, Procedures for Preparing LU Objectives and Strategies)*, the recommended approach to developing old-growth retention is through the establishment of old-growth management areas (OGMA) and associated LU objectives that will ensure retention and/or recruitment of old-growth structure over time.

Accord[illegible]o step one of this process (*LU Planning Guide* page 28), old-growth targets must be met using the non-co[illegible]uting land base first.

In addition, old-growth representation is to be managed at the biogeoclimatic ecosystem classification (BEC) variant level unless a resource management zone objective established as a higher level plan directs representation at a finer level or the chief forester permits an exception (*LU Planning Guide* page 28).

Where there is more than one possible location for an OGMA, choose the location that will minimize the impacts on the timber resource (e.g., use a retention VQO area prior to using a non-visually sensitive area) (*LU Planning Guide* page 29).

In LUs with a high- or intermediate-biodiversity emphasis, the intent is to capture the entire old-growth target in OGMAs immediately. Where there exists a deficit of old growth, recruitment OGMAs must be established so that the old-growth target will be achieved in the shortest possible time frame (*LU Planning Guide* page 30).

For LUs with a low-biodiversity emphasis, the OGMA target may be drawn down by two-thirds of the recommended targets (*LU Planning Guide, Appendix 2*). It is only acceptable to establish more than one-third of the OGMA target if it is determined through a timber supply analysis associated with the Timber Supply Review (TSR) that it will not cause additional timber supply impacts (*LU Planning Guide* page 30).

If (for LUs with a low biodiversity emphasis) the full OGMA target is not delineated and established, then a recruitment strategy must be developed that describes how to meet the target by the end of the third rotation (*LU Planning Guide* page 30).

Appendix 2 of the *LU Planning Guide* details landscape-level biodiversity objectives and seral stage retention targets for each natural disturbance type (NDT).

Base case assumptions for landscape units

Where the district manager has established LUs, they must be used in the base case. Where they have not been established, use the most recent draft LUs. Include in the IP a description of the status of the LU planning process.

Where the TFL forms only a part of a LU, for timber supply analysis the old-growth targets should be applied to the TFL portion of the LU. The assumption is that if each administrative unit meets the old-growth objectives, then the objectives will be met for the LU as a whole.

Where designated parks are located within the LU, a portion of the old growth within the park (area weighted...TFL area to LU area) may contribute to the old-growth targets for the TFL. The potential contribution of reserved old growth areas outside the TFL to the old-growth targets within the TFL should be discussed with Forest Service district and MELP staff and the Timber Supply Forester before including related assumptions in the IP.

Base case assumptions for biodiversity emphasis options

Where OGMAs have been established, they should be accounted for in the base case. The process for establishing all the necessary OGMAs for each LU will likely take some time. Where the process is incomplete and some OGMAs have been established, the method to be used in the model for reflecting OGMAs in conjunction with the old-seral targets should be discussed with Ministry of Forests district staff, Ministry of Environment, Lands and Parks staff and the Timber Supply Forester prior to submitting the IP.

In the base case, all old-growth targets must be applied at the biogeoclimatic variant level (unless a resource management zone objective directing representation at a finer level has been established as a higher level plan or the chief forester has permitted an exception).

Where LUs and BEOs have been established, old-growth targets reflecting the established BEOs for each LU must be modelled in the base case. Old-growth targets are documented in Appendix 2 of the *LU Planning Guide.*

Where LUs have not been established (i.e., where LUs are draft), government's policy direction documented on page 9 of the *Biodiversity Guidebook* (September 1995) should be applied in the base case. According to the policy, approximately 45% of each LU will be in the lower BEO, 45% in the intermediate BEO and 10% in the higher BEO. As a result, in the base case the area weighted average (i.e., 45/45/10) biodiversity constraints for the three BEOs should be applied for each variant in each draft LU. However, in some areas the LU planning process has advanced to such an extent that a different approach for modelling BEOs in the base case may be more suitable. The licensee should discuss with the Timber Supply Forester which approach should be used in the base case.

For established LUs with a lower BEO and for the lower BEO portion (45%) of the old-growth constraint in draft LUs, the target for the first rotation (80 years unless otherwise agreed to by the District Manager (DM) and Designated Environment Official) should be drawn down by 2/3. The objective is to attain the full old-seral target in three rotations (240 years) in areas managed for a lower BEO. Usually the constraint applied in the model is 1/3 of the full old-seral target for the first rotation, 2/3 for the second and 3/3 for the third. The expectation is that this modelling strategy will ensure that after three rotations sufficient old growth will be available to satisfy the full old-seral target.

Table 40 is an example of the kind of information that should be included in the IP.

Table 40. Old-seral targets

Landscape unit	BEC variant	NDT	Area (hectares)		BEO	Old age	Old seral constraint (% of productive)		
			Productive	Timber harvesting land base			1st rotation	2nd rotation	3rd rotation
Prasad	ICHmk1	3	3 392	2 569	45/45/10	140	10.5	12.6	14.7
Koch	ESSFwc2	1	5 978	5 125	Low	250	6.3	12.7	19
Caribou	CWHmm1	2	4 826	2 591	Interm.	250	9	9	9

Sensitivity analysis

The following table outlines which seral stage constraints from the *LU Planning Guide* must be applied in the base case and which ones should be applied in sensitivity analysis.

Table 41. Landscape-level biodiversity constraints

	Early seral stage	Mature plus old seral stage	Old seral stage
NDT 1&2			
Base case	Off	Off[a]	On
Sensitivity	Turn on and just show results	Turn on and just show results	On
NDT 3&4			
Base case	Off	Off[a]	On
Sensitivity	Turn on and just show results	Turn on and just show results	On

(a) "On" in the area covered by the Kootenay-Boundary Higher Level Plan Order.

The following two sensitivity analyses must also be conducted:

- show the impact on timber supply of applying the full old-seral target in low BEO LUs.
- show the impact on timber supply of applying the old-seral constraint reflecting the draft BEOs for each LU (where LUs and BEOs have not been established).

10.2.6.2 Wildlife tree retention

Background

One of the two priorities for LU planning is to establish LU objectives for wildlife tree retention.

Section 3.2 and Appendix 3 of the *Landscape Unit Planning Guide* (March 1999) detail the process for calculating wildlife tree retention requirements at the subzone level in order to establish LU objectives. Varying from these procedures may be necessary where an established higher level plan exists and directs otherwise.

On May 15, 2000, the Assistant Deputy Ministers of Forests and Environment, Lands and Parks approved changes to Section 3.2 of the *Landscape Unit Planning Guide*. Further detailed policy on management of wildlife trees is provided in the document *Provincial Wildlife Tree Policy and Management Recommendations* (February, 2000). The planning guide changes and the recommendations are available on the MoF Forest Practices Branch web site (http://www.for.gov.bc.ca/hfp/planning/lup/index.htm).

Operational planning for wildlife tree retention

For operational planning, the *Landscape Unit Planning Guide* (page 35a, note to step 4) states if OGMAs have not been established, Table A3.2 in Appendix 3 of the *Guide* should be used to determine the level of wildlife tree retention required and if OGMAs have been established, Table A3.1 should be used.

Base case assumptions for wildlife tree retention

Where OGMAs have been established, base case assumptions should reflect the management of these areas. Where OGMAs have not been established, Table A3.1 should be used in the base case. This approach recognizes that the OGMAs that will eventually be established will be comprised of the same old-seral forest composition that is modelled in the base case (i.e., the composition of OGMAs and the old-seral forest cover requirements applied in the base case are derived from the same tables in Appendix 2). In addition, the intent is to identify and establish OGMAs within the next few years. As a result, Table A3.1 will be applicable in operations for most of the 250-year period forecast in the analysis.

Wildlife tree retention may be accounted for through a land base reduction or a volume reduction. If the intention is to permanently retain wildlife trees, they should be accounted for through a land base reduction and the method used described in the description of the land base above. If wildlife trees will be replaced over time, a volume reduction at harvest may be more appropriate.

The following table is an example of the information that should be included in the information package.

Table 42. Wildlife tree retention constraints

Landscape unit	BEC subzone	Forested area (hectares)	Timber harvesting land base (hectares)	% subzone available for harvest	% timber harvesting land base harvested	Total wildlife tree retention (%)	Timber harvesting land base retention area (hectares)
A	SBSdk	58 957	49 524	84	30	8	1 980
A	ESSFmc	13 709	10 967	80	10	6	439

Please describe in detail and justify the method used to account for wildlife trees and patches.

10.2.6.3 Coarse woody debris

Current coarse woody debris (CWD) policy enables the management of CWD only within harvesting utilization standards. While the importance of CWD is clearly recognized within the *FPC* regulations, detailed provincial CWD management guidelines are currently lacking.

CWD management objectives must be defined in forest development plans and must be balanced with other, potentially competing, stand management objectives such as fuel management. At present forest companies are encouraged to leave behind as much CWD as possible provided it does not exceed the minimum utilization standards or interfere with other stand management objectives such as forest health.

In timber supply analysis for AAC determinations there is presently no need to account for CWD because the yield tables used to project timber supply only include the volume of timber that exceeds minimum utilization standards.

If and when a guideline or policy is developed that requires a level of CWD maintenance that exceeds minimum utilization standards, or if a higher-level plan objective dictates that a level of CWD maintenance exceeding minimum utilization standards is required, licensees are expected to account for CWD volumes exceeding minimum utilization standards in the base case of the timber supply analysis. The assumptions used to account for CWD must be clearly described in the information package.

10.2.6.4 Objectives for patch size distribution

According the *Landscape Unit Planning Guide* (March 1999), planning for the temporal and spatial distribution of cutblocks (patch size) is not a short-term priority for biodiversity planning (*LU Planning Guide*, Section 6.1). According to Section 3.3, detailed procedures for assessing patch size are still being developed. Objectives for patch size should be tested as draft prior to legal establishment. Section 4.6 C further explains the process to be used for establishing draft objectives for patch size distribution.

Unless objectives for patch size distribution have been legally established, they should not be modelled in the base case. Any assumptions for sensitivity analysis should be clearly documented in the IP. In addition, the status of the process leading to establishment of patch size distribution objectives should be described.

10.2.6.5 Objectives for connectivity

According the *Landscape Unit Planning Guide*, Section 6.1, landscape connectivity is not a short-term priority for biodiversity planning.

According to Section 3.5 of the *Guide*, current policy directs that maintenance of connectivity should not have a timber supply impact. It must be accomplished through strategic location of the OGMAs, partial cutting strategies, the planned distribution of cutblocks and through existing constrained areas such as riparian reserve zones (*LU Planning Guide*, page 39). Legally established resource management zone objectives may influence how and where connectivity is managed. Where connectivity is addressed, it should be done through draft objectives and the implications to timber supply should be explored in sensitivity analysis.

10.2.6.6 Watersheds

Community watersheds

In this section describe the objectives and modelling assumptions to be used for community watersheds. These must be developed in accordance with the *Community Watershed Guidebook* (October 1996). In developing modelling assumptions, particular attention must be given to Section 6, "Riparian management" and Section 8, "Harvest scheduling and cutblock size." Where watershed assessment information is available, it must be used to develop forest cover requirements for the community watersheds. Where no better information is available, the constraint described in Section 8.2.2, "Equivalent clearcut limits on sub-basins may be used."

Table 13. Community watersheds

Name	Productive area (hectares)	Timber harvesting land base area (hectares)	Current equivalent clearcut area (ECA)	Allowable ECA	Forest cover requirement	
					Green-up age	Allowable denudation %

Watershed assessments

For watersheds where management is proceeding in accordance with completed watershed assessment procedures, assumptions should be included in the base case to reflect this management. The proposed method to be used in the base case to account for this management must be described in detail in the information package. A table similar to Table 43, above, should be included in the IP.

10.2.6.7 Riparian management zones

As described in Section 6.9, in this section please describe the information available (e.g., current operational practice) and the management practices applied within this zone. The description might include forest inventory characteristics, harvesting pattern and merchantable volume retention. Also include details on proposed modelling methods (e.g., forest cover requirement, yield table volume reduction). The following table is an example of the kind of information that should be included.

Table 44. Riparian management zones

Zone	Riparian class	Length or perimeter (kilometres)	RMZ width (metres)	RMZ area (hectares)	e.g., Forest cover requirement		e.g., Volume retention (%)
					Minimum retention (%)	Age (years)	
	e.g. S2	50	40	166	40	80	
	e.g. S4	96	60	472			10
	e.g. L3	5	30	8	25	120	

10.2.6.8 Higher level plans

The management objectives of any higher level plans that are in place must be described in this package along with the methods to be used to account for them in the timber supply analysis. Detailed information may be better described under each section of the package and identified as being part of the higher level plan. In some situations it may be better to describe under one heading the higher-level plan objectives and the methods used to account for them in the analysis.

If the declaration of a higher level plan is imminent, or if management emphases associated with the plan are in draft form, it may be warranted to provide an option that demonstrates the timber supply implications of the imminent or draft plan. Proposed inclusion in the base case of draft higher-level plan assumptions should be discussed with the Timber Supply Forester during the preparation of the IP.

10.2.6.9 Any other non-timber resource management

Licensees are expected to keep informed of new or changed management requirements for non-timber resources. Where and when these are tied to timber supply, they must be accounted for in the base case or in a sensitivity analysis. The licensee should discuss any new timber supply related issues with the Timber Supply Forester during the preparation of the IP.

10.3 Timber harvesting

10.3.1 Minimum harvestable age/ merchantability standards

The purpose of this section is to identify the minimum criteria stands in an analysis unit must meet to be eligible for harvest. Economic factors will likely dictate the threshold when stands are deemed to be candidates for harvest. During periods of timber supply shortage the characteristics of stands that will be harvested will likely approach the minimum thresholds. For the purpose of timber supply modelling, these characteristics are often expressed in terms of volume per hectare and/or average diameter. In the model, the age at which the minimum thresholds are attained is then assumed to be the minimum harvestable age.

For each option considered, the minimum merchantability standard must reflect the assumptions used in that option (e.g., sawlogs, pulplogs).

Note that these are simply minimum criteria. While harvesting of stands at the minimum thresholds may occur in order to meet forest level objectives (e.g., maintaining overall harvest levels for a short period of time or avoiding large inter-decadal changes in harvest levels), some stands may be not be harvested until well past "optimal" timber production ages when management of other resource values take precedence (e.g., requirements for the retention of older forest).

Culmination age has also been used in timber supply analysis as the minimum harvestable age. Whatever ages are chosen, they must be supported with a reasoned explanation of the choice made.

Statistics at culmination age should be included in Table 39 for reference.

Table 45. Minimum merchantability standards

Zone/ group	Analysis unit	Minimum harvestable age (years)	Minimum average stand volume (m^3/hectare)	Minimum average stand diameter (cm)	Culmination		
					Age (years)	Average stand volume (m^3/hectare)	Average stand diameter (cm)

Discussion: (please explain how each minimum standard was determined and how they are applied).

10.3.2 Operability

The purpose of this section is to describe the assumptions that are used in determining the operable land base. These assumptions are usually based on physical and/or economic limitations to accessing stands that would otherwise be available for harvest.

The operable area can be divided into areas that are harvested using different harvest methods. These harvest methods usually fall into either the "conventional harvesting" category (i.e., harvest methods that are considered to be the usual methods used to harvest timber on the TFL) or the "non-conventional harvesting" category (i.e., harvest methods that are not often used or are new to operations on the TFL). The definition of "conventional" and "non-conventional" should be discussed with Forest Service district staff prior to completing the operability mapping discussed below.

Operability assumptions used in the base case must conform to the assumptions used in the operability mapping. The mapping must be submitted to and accepted by the district manager (or his/her staff) for each process leading to a new determination of the AAC.

Include the date operability mapping was accepted and the name of the Forest Service officer who approved it.

Table 46. Operability approval

Date approved	Approved by

Where areas that are accessible using non-conventional harvesting methods are proposed for inclusion in the base case timber harvesting land base, their inclusion must be supported (in the IP) by evidence of recent harvest performance in these areas. Where limited harvesting has been conducted in areas accessible using non-conventional harvest methods, the impact on timber supply of including the non-conventional areas should be investigated using sensitivity analysis or in an option.

Please provide a detailed description of the assumptions and methods used in determining the operable land base. If areas are proposed for inclusion in the timber harvesting land base that were not included before, provide justification for including them this time (e.g., recent performance information).

The purpose of Table 48 is to summarize by harvest method (e.g., skidder, highlead, long line, helicopter, feller buncher, etc.) the results of the operability assessment.

Table 47. Harvest methods

Zone/ group	Harvest method	Area (hectare)	Volume (m^3)
	Total conventional		
	Total non-conventional		
	Younger than harvest age		
	Operable land base		

Note: If second growth is being harvested, please provide the breakdown between old-growth and second-growth harvest by harvest method.

10.3.3 Initial harvest rate

The purpose of this section is to explain the rationale and/or method used in establishing the initial harvest rate for the base case. This should also be explained for each option and sensitivity analysis.

10.3.4 Harvest rules

The purpose of this section is to document the harvest rules that are used in modelling the base case and other options and sensitivity analyses. Several harvest rules have been used in timber supply analysis. For many harvest forecasts the absolute oldest stands are harvested first in the model. The use of the relative oldest first harvest rule is also widely used, whereby stands with the greatest difference between their age and their minimum harvestable age are harvested first. Other harvest rules may be used as well. For the base case, the rule applied should reflect current operational conditions.

Table 48. Harvest rule

Option/sensitivity analysis	Harvest rule	Description

If more detailed methods are used please describe them here.

10.3.5 Harvest profile

The purpose of this section is to document the methods that will be used in the model to account for the assumed harvest profile by species (or analysis unit or other). This profile may, for example, be specified in terms of minimum, maximum or actual area or volume or per cent area or volume harvested by decade.

This information is used to forecast potential deficits in particular species or forest types, and to examine the impact on sustainable harvest levels of harvesting different species profiles. It may also be used in an option that targets the areas specified in a 20-year-plan for the first two decades of the forecast period.

Criteria used to define the harvest profile:

Table 49. Harvest profile

Analysis unit	e.g. Volume or area harvested by decade[a]			
	1	2	3	4
1.				
2.				
3.				
etc.				

(a) Or volume (m^3), area (hectares) by decade.

Note: Include more decades if necessary.

10.3.6 Silvicultural systems

List the silvicultural systems currently employed on the TFL with the respective silvicultural regime. Certain practices may be geographically specific, such as selection harvesting, and these will have to be examined in relation to the corresponding forest cover requirements. Riparian management or wildlife considerations should also be described if some partial cutting system is prescribed.

Management strategies and the method proposed for incorporation in the base case and/or sensitivity analysis must be fully documented in the information package for each component of a variable retention management system.

Effects and the method used to account for the effects of each silvicultural system or each component of a variable retention management system on growth and yield (e.g., shading effects, residual stand volume and growth) must be reviewed and accepted by research branch staff. Licensees should discuss proposed methods with research branch staff before preparing the information package.

Table 50. Silvicultural systems

Silvicultural system	**Eligible analysis units or locations**	**Productive area (hectares)**	**Timber harvesting land base area (hectares)**	**% retention**	**# of entries**	**Time between entries (years)**
e.g. Partial cut (RMZ)	Spruce types			50%	1	80
e.g. Selection	All			70%	3	30
Silvicultural system	Eligible analysis units or locations	Productive area (hectares)	Timber harvesting land base area (hectares)	% retention	# of entries	Time between entries (years)
e.g. Partial cut (RMZ)	Spruce types			50%	1	80
e.g. Selection	All			70%	3	30

Please describe in detail the information source and provide any necessary comments.

Description of methods used: e.g., growth and yield model used, method used to model partial harvesting

10.3.7 Harvest flow objectives

Knowledge of the underlying assumptions about harvest flow, or pattern over time, are essential to enable interpretation of timber supply analyses. Guidance in developing harvest flow objectives is taken from the current economic and social objectives of the Crown expressed by the Minister of Forests in a letter to the chief forester in 1994. He emphasized the importance of the continued availability of good forest jobs and the long-term stability of communities that rely on forests. He stated that any decreases in allowable cut at this time should be no larger than necessary to avoid compromising long-run sustainability.

Thus, an attempt should be made to attain the current AAC for as long as possible in the base case and then decline at a reasonable rate (< 10 % per decade if possible) to the long-term harvest level. The long-term harvest level is the highest harvest level that can be attained for the long term while maintaining a stable (flat line) total inventory.

Situations may occur where a medium term decline below the long-term harvest level is warranted. In some cases modelling initial harvest levels above the current AAC may also be warranted. Licensee analysts should review several timber supply analyses for Timber Supply Areas (TSA) to gain a better understanding of harvest flow patterns currently considered by the chief forester in making AAC determinations. In addition they should contact the Timber Supply Forester at Timber Supply Branch to discuss any marked departures from the harvest flow objectives that are common in TSA analyses.

The purpose of this section is to describe the objectives that are used in modelling the harvest flow for the base case, each option and each sensitivity analysis (e.g., harvest at current AAC and decline at no more than 6% per decade to the long-term harvest level; unconstrained; harvest at current AAC whenever possible, etc.).

Table 51. Harvest flow objectives

Harvest flow objectives for option: _____
1.
2.
3.
4.
↓

10.4 Other

Include any other information not covered by this guide that impacts on timber supply. If this information cannot be incorporated into the model, provide estimates of impacts on timber supply in the short-, medium- and long-term.

If this information is incorporated in the model, provide the information source operational requirements, performance information and discuss the modelling methods used.

11 Option Assumptions

In this section please describe in detail the assumptions that are used for each option. Note that this may have been adequately covered in Table 2. Only the differences between the assumptions in the base case and the option need to be documented. Include land base information (e.g., land base reduction table) and any other relevant information in a similar format to the assumptions documented for the base case that will help describe the intent of the option.

Appendix 1 Standardized Format for Yield Table Submissions other than VDYP and TIPSY

March 2001

Appendix 1

Purpose

The review of yield tables submitted in TFL management plans is time consuming. A common standard for the submission of yield table data will facilitate the review undertaken by Research and Inventory Branch staff. The following is the required format:

Standard of submission

- Submit yield table data in DOS compatible ASCII format;
- Submit each table in a separate DOS file;
- Submit all files (i.e., tables) in the same format; and
- Use mnemonic naming conventions.

Format of yield table data file

Each file shall contain two main sections; the header information and the yield information as follows.

1) Header information

Describe each yield table using exactly 15 lines (blank lines are permitted). The following information is required in the header:

- Identification (e.g., Title, TFL#, management and working plan (MWP) #);
- Site index (50 years breast height-age);
- Initial planting or establishment density (stems/hectare);
- Time and details of treatments (e.g., spacing, fertilizing, etc.);
- Merchantable specifications (dbh limit, top diameter, and stump height);
- Percentage reductions (if applicable) for decay, waste, and breakage. State if the tables are gross, or net of these reductions?
- Other netdowns (e.g. %, m^3/hectare) for operational falldown (e.g., operational adjustment factors). Are tables gross or net of these reductions?
- Regeneration delay contributing to total age;
- Number of years to reach breast height;
- Maximum mean annual increment (MAI) (year and amount).

2) Yield information

Supporting documentation must be included indicating how the yield tables were generated including all assumptions and which site index curves were used.

Appendix 1

For yield tables generated using models other than variable density yield prediction (VDYP) or table interpolation program for stand yields (TIPSY), the following variables must be included in each table in the stated columns and starting on line number 16:

Column	Variable	Unit
1–5	Total age	Years
6–10	Top height	Metres
11–20	Total volume	Cubic metres per hectare
21–30	Merchantable volume	Cubic metres per hectare
31–40	Diameter	Centimetres (specify quadratic or arithmetic mean)
41–50	Mean annual increment	Cubic metres per hectare/year

Additional variables (if applicable) can appear in the remaining columns. The following format is suggested:

Column	Variable	Unit
51–60	Basal area	m^2/hectare
61–70	Density	Stems/hectare
71–80	Optional additional data	

Note: Use 80 columns maximum.

Example of standard format

The following example outlines the standard format for yield tables submitted in TFL management plans. The first 15 lines contain header information and the remaining lines contain the yield table data. The header information can be any format, but must use 15 lines. In this example:

Appendix 1

The first line of test after the dashed line indicates the first line of the file, and the dashed line after the column heading is marked every 10 columns for your convenience.

1. Header line containing any of the required information
2. Header line containing any of the required information
3. Header line containing any of the required information
4. Header line containing any of the required information
5. Header line containing any of the required information
6. Header line containing any of the required information
7. Header line containing any of the required information
8. Header line containing any of the required information
9. Header line containing any of the required information
10. Header line containing any of the required information
11. Blank lines permitted
12.
13. Tot Top Total Merch
14. Age Ht. Vol. Vol. Diameter MAI Other Var.>
15. ----------1----------2----------3----------4----------5----------6
16. 10 1.6 0 0 0.1 0
17. 20 4.7 24 0 2.5 0
18. 30 8.0 82 0 5.0 0
19. 40 10.8 142 20 7.6 0.5
20. 50 13.3 200 87 9.9 1.7
21. 60 15.3 254 161 11.9 2.7
22. 70 17.0 298 218 13.5 3.1
23. 80 18.4 335 265 14.9 3.3
24. 90 19.6 366 304 16.0 3.4
25. 100 20.6 388 339 17.1 3.4
26. 110 21.5 406 364 18.2 3.3
27. - - - - - -

etc. - - - - - -

Appendix 1

Ministry approved yield table generation programs

TIPSY — A Table Interpolation Program for Stand Yields

Contact TIPSY Coordinator at:

British Columbia Ministry of Forests
Research Branch
Forest Productivity and Decision Support Section (FPDS)
P.O. Box 9519, Stn Prov Govt
3rd floor, 712 Yates Street
Victoria, B.C. V8W 9C2

Fax: 387-8197
Phone: 387-6718

VDYP — Variable Density Yield Projection System

Contact Supervisor, Growth and Yield Predictions at:

British Columbia Ministry of Forests
Resources Inventory Branch
P.O. Box 9516, Stn Prov Govt
722 Johnson Street
Victoria, B.C. V8W 9C2

Fax: 387-5999
Phone: 387-6043

Timber Supply Analysis

Purpose

To present information regarding the short- and long-term timber supply forecasts that may be considered in the CF's determination of the AAC for the TFL under *Section 8* of the *Forest Act*.

Licence requirements

2.22 Where the Timber Supply Forester accepts the assumptions and the methodology under paragraph 2.06, the Licensee, not less than 10 months prior to the date on which the management plan in effect under this licence is due to expire, will submit a timber supply analysis to the Timber Supply Forester.

2.24 Where the Timber Supply Forester accepts a timber supply analysis under paragraph 2.22 or subparagraph 2.25(b),

(a) the Timber Supply Forester, within three months after the date on which the timber supply analysis is submitted under paragraph 2.22, or one month after the date the timber supply analysis is submitted under subparagraph 2.25(b), will in a notice given to the Licensee accept the timber supply analysis, and

(b) where the Timber Supply Forester accepts the timber supply analysis under subparagraph (a), provide the Licensee with an assessment of the strengths and weaknesses of the timber supply analysis.

2.25 Where the Timber Supply Forester does not accept a timber supply analysis under paragraph 2.24,

(a) the Timber Supply Forester, within three months after the date on which the Timber Supply Forester receives a timber supply analysis submitted under paragraph 2.22, or one month after the date on which the Timber Supply Forester receives a timber supply analysis submitted under subparagraph (b), will specify in a notice given to the Licensee why the Timber Supply Forester has not accepted the timber supply analysis, and

(b) the Licensee, within one month after the date on which the Licensee is given the notice referred to in subparagraph (a), will submit a new or revised timber supply analysis to the Timber Supply Forester.

Content

2.23 A timber supply analysis submitted under paragraph 2.22 or subparagraph 2.25(b) must be based on the assumptions, and use the methodology, accepted by the Timber Supply Forester under paragraph 2.06.

Roles and responsibilities

Licensee

- **Month 10 or sooner:** Submits Analysis (see 2.22) to TSF and copies to region and district. Notifies MELP FES in district that one copy submitted to DM for use by DM and MELP. If requested, submits one copy of draft MP to MELP FES as well.
- **Within one month of rejection (if applicable):** Submits, with copies to region and district, revised analysis (see 2.25).

TSF

- **Month 7 or sooner, or within 1 month of receiving revised Analysis**: Either accepts Analysis and provides an assessment (see 2.24), or rejects (2.25) analysis.

Tree farm licence timber supply analysis report guide

Objective

The objective of this document is to provide guidance for the preparation of timber supply analysis reports, not to provide a template that must be followed precisely. The presentation of the analysis is left to the innovation and imagination of each analyst, keeping in mind that it will be scrutinized by the public and special interest groups. The content of the analysis must include, as a minimum, the information listed in this document.

Most importantly, the analysis must provide the chief forester with the information he needs to determine the allowable annual cut for the Tree Farm Licence (TFL).

Purpose of Analysis

The purpose of analyzing any issue is to provide insight into the nature of the issue. This requires that:

(a) the issue is described in detail;

(b) the results of the analysis of the issue are described and discussed in detail giving reasons for the outcomes of the analysis; and

(c) that the main variables affecting the analysis, and how uncertainty, with the associated possible changes in these variables, affect the outcome of the analysis, are discussed.

Timber supply analysis is no exception to this generality.

Uncertainty

Most of the assumptions used in timber supply analysis are bounded by uncertainty. In order to assess the risk to timber supply of any assumption used in the base case being incorrect, sensitivity analysis must be conducted to provide a measure of potential impacts of having incorrectly estimated the information. The analysis report must describe sensitivity analysis results, providing assessments of the likelihood that the assumption is correct or over- or under-estimated.

Report Structure

The analysis report submitted to the Ministry of Forests (MoF) should contain two broad sections:
1) the written report, and 2) model input and output.

Audience

Recognizing that timber supply analysis is technical in nature and that a cross-section of the public will want to read and understand the analysis, the report should be written for the non-expert, technical reader.

1) The Written Report

The written report contains 1) all the data and assumptions that are used in the analysis; 2) the results of the analysis; 3) the interpretation of the results of the analysis; and, 4) a recommended course of action supported by the results and interpretation of the analysis.

1) Data and assumptions

An outline of each assumption must be provided in the text. More detailed discussion must be provided for data for which there is a high degree of uncertainty. The completed information package must be appended to the report.

2) Results

The results of the analysis must be presented. This should be done using text, summary tables and graphs..

Tree farm licence timber supply analysis report guide (continued)

3) Interpretation

Whereas the presentation of the results is factual in nature, the interpretation is intuitive and provides deeper insight into related issues and their impacts on timber supply. It explains why the timber supply picture is what it is and discusses the sensitivity of the timber supply to changing assumptions.

Note: Explanations must be provided for each harvest forecast (e.g., rationale for the initial harvest rate; reasons for declines/rises in the schedule; the relationship between the schedule and the long-term harvest level; how do the modelling constraints and available inventory affect the forecast; how might constraints on the timber supply that could not be modelled affect the schedule).

4) Recommendation

Analysis should generally lead to a recommended course of action. Discussion of the recommendation must include supported by the results and interpretation of the analysis. It must also include the potential consequences of under- and or overestimating the magnitude of the more sensitive issues (i.e., due to information gaps, lack of technology, poorly understood issues etc.).

2) Model Input and Output

Model "input" and "output" must be provided to enable the timber supply analyst charged with reviewing the analysis to verify the results of the analysis.

The following information is required with the analysis report. Additional information may be requested as the review of the analysis progresses.

Required Documentation

Input

Model input files must be provided to allow the MoF analyst to verify that the input assumptions documented in the report were in fact used in modelling the harvest forecast.

MoF staff may require that the entire input file in digital form and in a specified format be submitted. This information will be used to attempt to reproduce the results presented by the licensee using the MoF model (FSSIM).

Output

The following information is required:

Area and volume and age harvested per decade

Total to be appended to the report
Detail by analysis unit (AU) to be provided in digital form

Age class distribution by decade, merchantable and total, by area and volume

First and last decade (period) to be appended to the report
All decades (periods) to be provided in digital form

Average volume/hectare and average diameter harvested by decade

Total to be appended to the report
Detail by AU to be provided in digital form

Silviculture program by decade and AU (area treated by treatment type including cost)

Total to be included in the report
By AU to be supplied in digital form

Tree farm licence timber supply analysis report guide (concluded)

Periodic growth by decade

Long-run sustained yield

Define and explain how it was calculated.

Long-term even-flow harvest rate

Explain how it was determined.

MSY

Define and explain how it was calculated.

Twenty-Year Plan

Purpose

The TYP is a hypothetical operational plan to be considered by the CF in the AAC determination. It supports the base case of the analysis by spatially confirming a hypothetical sequence of cutblocks that could be harvested over a period of 20 years.

Follow these guidelines when regional and district TYP guidelines are not in place. Where applicable, regional and district TYP guidelines should include the following:

Licence requirements

2.18 Where the Timber Supply Forester accepts the assumptions and the methodology under paragraph 2.06, the Licensee, not less than 10 months prior to the date on which the management plan in effect under this licence is due to expire, will submit a 20-year plan to the District Manager.

2.20 Where the District Manager accepts a 20-year plan referred to under paragraph 2.18 or subparagraph 2.21(b),

(a) the District Manager, within three months after the date on which the 20-year plan is submitted under paragraph 2.18, or one month after the date the 20-year plan is submitted under subparagraph 2.21(b), will in a notice to the Licensee accept the 20-year plan, subject to such conditions as considered necessary or appropriate, and

(b) where the District Manager accepts the 20-year plan under subparagraph (a), provide the Licensee with an assessment of the strengths and weaknesses of the 20-year plan.

2.21 Where the District Manager does not accept a 20-year plan under paragraph 2.20,

(a) the District Manager, within three months after the date on which the District Manager receives a 20-year plan submitted under paragraph 2.18, or one month after the date on which the District Manager receives a 20-year plan submitted under subparagraph (b), will specify in a notice given to the Licensee why the District Manager has not accepted the 20-year plan, and

(b) the Licensee, within one month after the date on which the Licensee is given the notice referred to in subparagraph (a), will submit a new or revised 20-year plan to the District Manager.

Content

2.19 A 20-year plan submitted under paragraph 2.18 or subparagraph 2.21(b) must

(a) identify

(i) the timber harvesting land base,
(ii) harvested areas,
(iii) existing and proposed road access within the net timber harvesting land base, and
(iv) areas subject to special integrated resource management constraints, such as use of the Licence Area for purposes other than timber production,

(b) categorize areas within the timber harvesting land base referred to in clause (a)(i) by

(i) the type and quality of timber, and
(ii) the harvesting methods suitable to the terrain, and

Twenty-Year Plan

Content (concluded)

(c) in support of the timber supply analysis, set out a hypothetical sequence of cutblocks in 5-year increments over a period of 20 years, or longer if the Licensee so chooses, which is consistent with

(i) this Licence,
(ii) the Acts, regulations and standards referred to in paragraph 9.01,
(iii) higher level plans, and
(iv) subject to paragraph 2.37, the guidelines referred to in subparagraph 2.03(b)

Roles and responsibilities

Licensee

- **Month 10 or sooner:** Submits TYP (see 2.18). Copy to TSB.
- **Within one month of rejection (if applicable):** Submits revised TYP, with copy to TSB (see 2.21).

DM

- **Month 7 or sooner, or within 1 month of receiving revised TYP**: Either accepts TYP and provides an assessment (see 2.20), or rejects (2.21) TYP.
- Co-ordinates review with MoF staff.

Example formats – TYP Terms of Reference, and TYP

Using the harvest levels projected for the first 20 years in the base case of the analysis, the TYP will show where the projected levels can be achieved (in 5-year increments) while adhering to the management practices defined for the base case scenario in the IP.

Although the assumptions used in the analysis are the same as those in the TYP, they are applied differently. In the Analysis, averages are often used and applied over aggregates of areas with similar management objectives. In the TYP the same assumptions are applied on a site-specific basis.

Note that portions of the forest development plan may be used as a starting point for incorporation into the first five-year period of the TYP, as agreed to with the District Manager.

Terms of Reference

The licensee is encouraged to prepare a Terms of Reference for the approval of the DM, prior to initiating a TYP. Based on the IP, the terms will describe:

- Identified constraints and how their application differs from application in the analysis.
- Guidelines to be followed (these should be listed in draft MP).
- Information status and format/type of TYP information to be presented.
- Include sample mapsheet of final product.
- Include TYP completion and review timeline.
- May include recommended date to discuss TYP and/or analysis.
- Any other information relevant to harvest scheduling over the proposed 20-year period.

Example format (continued)

Supporting Information

The TYP must:

- Report on assumptions used and how each was addressed.
- Verify that objectives inherent in assumptions used were met.
- Document any differences between final product and intended product described in the terms of reference.
- Include:
  - mapsheet or other suitable unit description (e.g. forest district)
  - summary of area and volume harvested by 5-year period by operability type, silviculture system and harvest method.
  - volume by species where required.

And should be included as an appendix of the proposed MP. The TYP should be consistent with the assumptions used in the base case.

Mapsheet Presentation

Should be consistent with the base case. Such information as agreed to with the DM should be provided in order for the TYP to be evaluated by MOF staff. May be presented on one or more maps with different themes.

- Forest cover maps (1:50,000 or as agreed to with DM)
- Should not exceed 70 by 100 cm
- Should include:
  - (a) Licence boundaries
  - (b) Municipal and community watershed boundaries
  - (c) Cutblock boundaries on approved forest development plan
  - (d) Broad timber types, including areas younger than green-up age (e.g. VQOs, IRM zones)
  - (e) NSR areas
  - (f) Operability as defined by an approved operability plan
  - (g) Years of harvestable timber by block, colour coded into 5-year periods.
  - (h) Harvest system for each block.
  - (i) Existing roads and river crossings
  - (j) Future (up to 20 years) main road projections to at least mapped cutblock boundaries
  - (k) Management zone boundaries (e.g known scenic areas (and established VQOs). Include all constraint boundaries as well as areas of overlap.
  - (l) Land use planning boundaries
  - (m) Sensitive sites (e.g. deer winter range, riparian areas)
  - (n) Existing recreation developments
  - (o) Priority cutting areas
  - (p) LU boundaries
  - (q) Other resources with timber supply implications (e.g. OGMAs, WHAs)

Example format (concluded)

- Legend for each map:
  (a) TFL and licensee name
  (b) Term
  (c) Completion date
  (d) Notation that it is only a projection and not a definitive operational plan
- Map features should be compatible with MoF cartographic manual.
- Any other information to facilitate review of the TYP.

Proposed Management Plan

Purpose

The purpose of the proposed management plan (PMP) is to:

- Present to the CF for approval, the licensee's objectives and strategies for managing resources within the TFL.
- Incorporate where appropriate, comments from the Ministry of Forests, other agencies and the public.

The PMP includes the accepted IP, TSA and TYP.

Licence requirements

2.26 The Licensee, not less than four months prior to the date on which the management plan in effect under this Licence is due to expire, will submit to the Chief Forester and Regional Manager

(a) a proposed management plan which is based on the draft management plan referred to in paragraph 2.08, and

(b) incorporates the Licensee's proposals, if any, to address the comments received from the review of the draft management plan as specified in paragraph 2.17

2.28 Subject to paragraphs 2.29 and 2.30, the Chief Forester, within two months after the date on which the Chief Forester receives a proposed management plan submitted under paragraph 2.26, subparagraph 2.31(b) or subparagraph 2.41(b), will in a notice given to the Licensee approve the proposed management plan, subject to such conditions as the Chief Forester considers necessary or appropriate, if

(a) the Chief Forester is satisfied that the proposed management plan

(i) meets the requirements of paragraph 2.26 and paragraph 2.27 or clause 2.41(b)(i), as the case may be, and

(ii) incorporates the proposals referred to in subparagraph 2.26(b).

2.31 Where the Chief Forester does not approve a proposed management plan under paragraph 2.28,

(a) subject to paragraphs 2.29 and 2.30, the Chief Forester, within two months after the date on which the Chief Forester receives the proposed management plan, will specify in a notice given to the Licensee why the Chief Forester has not approved the proposed management plan, and

(b) the Licensee, within one month after the date on which the Licensee is given the notice referred to in subparagraph (a), will submit a new or revised proposed management plan to the Chief Forester.

2.41 If the Licensee fails to comply with the requirements of paragraph 2.40, the management plan in effect under this Licence will expire three months after the date on which the notice referred to in paragraph 2.38 is given to the Licensee, in which case,

(b) within six months after the date on which the management plan expires under this paragraph, the Licensee will submit to the Chief Forester a proposed management plan which is based on the draft management plan referred to in subparagraph (a),

Proposed Management Plan

Content

*Content of draft MP and proposed MP are identical except for wording differences or additional requirements highlighted in **bold** below. The only other differences, which are not identified, are insignificant changes in wording, numbering and lettering.*

2.27 A **proposed** management plan **submitted by the Licensee under** paragraph 2.26, subparagraph 2.31(b) or 2.41(b) must

(b) **be signed and sealed by a professional forester, and signed by the Licensee or an authorized signatory of the Licensee,**

(c) be consistent with

(i) this Licence,
(ii) the Act, regulations and standards referred to in paragraph 9.01,
(iii) higher level plans, and
(iv) subject to paragraph 2.37, the guidelines referred to in subparagraph 2.03(b),

and take into consideration the Regional Manager's review under paragraph 2.03

(i) **include**

(i) the timber supply analysis accepted under paragraph 2.24, together with the assessment referred to in subparagraph 2.24(b), and
(ii) the 20-year plan accepted under paragraph 2.20, together with the assessment referred to in paragraph 2.20(b), or

(j) assess the impact the **proposed** management plan **will** have on factors such as harvest levels,

(k) highlight the key similarities and differences between the **proposed** management plan, and the management plan in effect

(ii) the impact, if any, that the Licensee anticipates implementation of the **proposed** management plan will have

on factors such as those referred to in subparagraph (j),

Roles and responsibilities

Roles and responsibilities regarding paragraph 2.41 — which results from current MP being rendered inadequate — are identical to those below except for submission and response timing.

Licensee

- **Month 4 or sooner**:
  - Should contact regional contact prior to submission.
  - Submits to CF and RM (see paragraph 2.26).
  - Submits to remaining parties that received a copy of draft MP the revisions and inserts to text and maps that, in effect, result in a copy of the proposed MP.
- **Month 2 or sooner**: After regional contact reviews proposed MP, submits necessary further revisions and inserts to text and maps to all parties that received a copy draft MP.
- **Within 1 month of non-approval (if not approved):** Submits new or revised proposed MP.

Roles and responsibilities (continued)

Regional Manager

- **Upon receipt:**
  - Regional contact reviews and may request comments from district(s), region and branches. (MELP/MoF may need to ensure consistency in comments).
  - Regional contact ensures that all comments were considered and necessary revisions were carried out.
  - When acceptable, sends memo to CF recommending approval and suggestions for addressing any issues.

MP Review Contacts:

- Responds to regional contact in timeframe specified.

CF

- **Month 2 or sooner**

  Either approves with or without conditions (see 2.28), or does not approve (2.31) proposed MP.

Example format

The MP must at minimum be consistent with the requirements of paragraph 2.27(c), except for guidelines. For further information, see page 4 Item 3(c).

The example formats for the draft MP (see pages 12–15) and proposed MP are identical except for the following differences and additional requirements. See italicized comment above paragraph 2.27 on page 89 for further information.

2.27(b) The signature and seal of a professional forester as well as licensee signature.

2.27(j) Assess the impact the implementation of the **proposed** MP will have on…

2.27(k) Highlight key similarities/differences between the current and **proposed** MPs; and summarize any impact from:

- implementing current MP, and
- implementing **proposed** MP on.

2.27(m) Public and MoF Involvement

The proposed MP will summarize the comments on the draft MP (*and the IP if also referred*) resulting from both the referral to the RM and the public (this includes agency) review.

Summarize any differences between the draft MP and the proposed MP, including the differences resulting from modifications made in response to the MoF and public review.

Details can be included in the appropriate appendix.

Example format (concluded)

Appendices
(2.27(m), (n))

I **(Accepted) Timber Supply Analysis Information Package**

II **(Accepted) Timber Supply Analysis and Assessment**

III **(Accepted) Twenty-year Plan and Assessment**

IV **Public and MoF Review**

Copies of comments and responses to draft MP review.

V **Map Folio**

Updated as compared to those submitted in the draft MP.

AAC Decision and MP Approval

The CF determines the AAC and approves the MP, usually by the legislated deadline date for the AAC determination. These processes often involve:

- "Dry run" meeting of MoF and MELP prior to the AAC/MP meeting in Victoria with CF.
- Possible field trip by CF to review TFL, or presentation in Victoria by TFL holder.
- AAC/MP meeting where MP conditions if any, and *Section 8*, *Forest Act* factors are discussed.
- Working with the CF, TSB drafts AAC rationale and RTEB draft MP approval/AAC determination letter, all for CF signature.
- Communications Branch develops news release and communications plan.

For further information contact the TSB, or the TFL section at RTEB.

(Optional) Calendar Year Reporting

Purpose

To monitor the licensee's performance on the TFL for the previous calendar year.

If the RM requires a calendar year report, the request for the report must be served no later than April 1st.

Licence requirements

11.01 The Regional Manager, in a notice given to the Licensee by April 1, may require the Licensee to submit a report containing such information as the Regional Manager requires regarding

(a) the Licensee's performance of its obligations under or in respect of this Licence, the approved management plan, the allowable annual cut rationale, and conditions from the Chief Forester's management plan approval letter, and

(b) the processing or other use or disposition of the timber harvested under this Licence

in the previous calendar year if the information is not included in any other reports which the Licensee must submit under the Acts or regulations referred to in paragraph 9.01.

11.02 Upon receipt of a notice referred to in paragraph 11.01, the Licensee, on or before the date specified in the notice, must submit a report to the Regional Manager containing the required information.

Roles and responsibilities

Regional Manager (RM)

- **On or before April 1 each year**: Reviews MP commitments and CF directives. May serve notice requiring submission of report (see paragraph 11.01)

Licensee:

- Submits report on or before date specified (see 11.02)

Regional Manager

- Reviews report with input from district and branches, and formally responds
- Monitors licensee compliance

Example format

The report should be brief. Operational and other details not required by the RM may be included if the report is also being used for other purposes.

1. Title Page/Table of Contents/Introduction

(Optional) Calendar Year Reporting

Example format (concluded)

2. Obligation Performance (11.01(a))

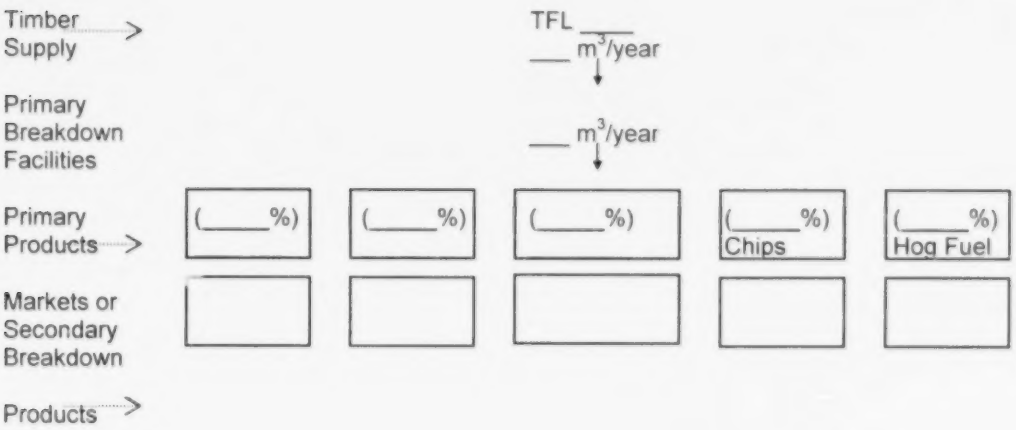
(a) Summarize performance in the previous calendar year regarding obligations under or in respect of the:

- Licence
  (e.g., statement on contractor clause requirement, and unique TFL conditions)
- Approved MP
  (e.g., success in meeting individual management objectives; progress in updating inventories; and plans to deal with inconsistencies with other plans, initiatives or planning direction from government agencies)
- AAC rationale
  (e.g., from 'Implementation' part of rationale)
- Conditions in the CF's MP approval letter
  (e.g., partition harvesting)

(b) Provide goals and major initiatives for the next calendar year.

3. Timber Processing/Disposition (11.01(b))

Provide necessary descriptive text, and a fibre flow diagram similar to:



Acronyms

AAC	Allowable Annual Cut
Analysis	Timber Supply Analysis
AU	Analysis Unit
AUM	Animal Unit Month
BEO	Biodiversity Emphasis Options
BGB	Biodiversity Guidebook
CF	Chief Forester
CORE	Commission on Resources and Environment
CWAPS	Coastal Watershed Assessment Procedure System
DFO	Department of Fisheries and Oceans
DM	District Manager
DMP	Draft Management Plan
ESA	Environmentally Sensitive Area
FEN	Forest Ecosystem Network
FES	Forest Ecosystem Specialist
FIZ	Forest Inventory Zone
FPC	Forest Practices Code
FRBC	Forest Renewal British Columbia
FSSIM	Forest Service Simulation Model
GIS	Geographic Information System
HLP	Higher Level Plan
IP	Timber Supply Analysis Information Package
IWAPS	Interior Watershed Assessment Procedure System
LRMP	Local Resource Management Plan
LU	Landscape Unit
MELP	Ministry of Environment, Lands and Parks
MoF	Ministry of Forests
MP	Management Plan
MPR	Management Plan Review
MSY	Maximum Sustained Yield
MSYT	Managed Stand Yield Tables

Acronyms

NCC	Non-Commercial Cover
NRL	Non-Recoverable Losses
NSR	Not Sufficiently Restocked
NSYT	Natural Stand Yield Tables
OAF	Operational Adjustment Factor
OGMA	Old-Growth Management Areas
OGSI	Old Growth Site Index
PFG	Post Free Growing
PMP	Proposed Management Plan
PSP	Permanent Sample Plot
PSYU	Public Sustained Yield Unit
RIC	Resources Inventory Commission
RM	Regional Manager
RMZ	Riparian Management Zone
ROS	Recreation Opportunity Spectrum
RTEB	Resource Tenures and Engineering Branch
SBFEP	Small Business Forest Enterprise Program
SUD	Satisfactory User Days
TFL	Tree Farm Licence
THLB	Timber Harvesting Land base
TIPSY	Table Interpolation Program for Stand Yields
TSA	Timber Supply Area
TSB	Timber Supply Branch
TSF	Timber Supply Forester
TYP	Twenty-Year Plan
VQO	Visual Quality Objective